

The Week

HOME 1-5
 UGC to treble primary teacher training places
 NUS blueprint for local control of universities
 Textbook price rises moderate, says report
 Ulster poly row over teaching hours

NORTH AMERICA 6
 Pentagon plan to renew research links with universities
 White House science committee holds first meeting
 Reagan reverses tax exemption policy on "racist" colleges
 American YOP scheme to start in autumn

OVERSEAS 7-8
 French ministry sets up university research branch
 German lecturers urged to spend more time with students
 Rural students are still underrepresented in Polish colleges
 Tanzanian professor detained in Zaire
 Colombia reverts to political disinterest after revolutionary excitement
 Gunther Kloss describes the first 10 years of the new University of Bremen

ARTICLES 9-13
 Hillhead-by-election: Olga Wojtas reports from Britain's most intellectual constituency, 9
 The research function: full report and summaries of the papers at the fourth Leverhulme seminar, 10-12
 Bernard Bergonzi discusses the persistence of the powerful literary myths of the 1930s, 13

BOOKS 14-22
 Richard Bessel reviews three new books on the Nazis and the Holocaust, 14
 As Milner-Chibrikoff discusses Russian plots of the Revolution (15), and R. J. P. Williams reviews a new study of 'blonergetics' (16)

SOCIOLOGY BOOKS 17-22
 Kenneth Minogue reviews the first volume of Anthony Giddens' critical account of historical materialism, 17
 The National Union of Railwaymen, the future of the sociological classics, ethnic segregation, industrial sociology, and feminism are among the subjects of new books in sociology

NOTICEBOARD 23

CLASSIFIED INDEX 24

OPINION 30-32
 George Rainsford discusses what we can learn from the ancient Greeks; Christopher Price MP looks forward to "open" UGC government; and Don's Diary from Professor Paul Sarnet of University College, London, 30
 Letters on polytechnic finances and Wadham admissions; and John Kelly of the AUT discusses an alternative to the UGC in "Open Views", 31

Next Week

Zhores Medvedev on Soviet science
 The record of the SSRC
 Tessa Blackstone on poverty
 University museums under threat
 William Birch on improving NABs
 New books on mathematics and physics



HIGHER EDUCATION SUPPLEMENT
 200 Gray's Inn Road, London WC1X 8EZ. Telephone 01-837 1234

The research jungle

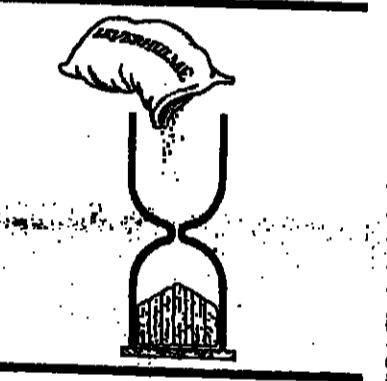
The structure of research established in the 1960s is creaking - some might say, cracking - in the 1980s despite the clear evidence that the science budget is the one element of public expenditure on higher education which the present Government is determined to protect. The dual support system under which the University Grants Committee is supposed to provide a research "floor" for all universities has been so gravely undermined by the recent cuts that it is difficult to see how it can be reestablished, except possibly on a selective and so divisive basis. The equipment grant from the UGC to the universities has been woefully inadequate for several years. The research councils since the middle 1970s have been under the spell of Lord Rothschild's "customer-contractor" principle which, no doubt unintentionally, has had the effect of undervaluing fundamental research and overvaluing derivative problem-solving research. The number of post-graduate awards has declined, especially in the beleaguered social sciences. The cracks, or cracks, are getting louder year by year.

The causes of this decay in the structure of research lie back in the 1960s when, although the research councils were established, no general organizing principle to underpin this new organization of higher education's research effort emerged to match the Robbins principle that has guided the development of the system's teaching "floor". The concept, popular in the late 1960s and early 1970s, that research should be supported if it showed "timeliness" and provided a "backstop" to support a framework in which detailed priorities could be established. As a result the two most basic questions of all - how much and what kind of research do we need? - remained effectively unanswered. So long as there was a strong dual support system, an equally strong consensus within disciplines about intellectual priorities, and a higher education system with ever increasing financial and physical resources for research as a by-product of the Robbins expansion of the number of students and with plenty of room for a new generation of young research-minded scholars and scientists, a policy of unreflective pluralism seemed entirely adequate.

This age of innocence (and of independence?) came to an end and two main reasons, both in their different ways symptoms of the British "disease" of disappointing economic growth. First, the expansion of higher education slowed down to be replaced eventually by a policy of deliberate contraction. As unit costs fell, students still had to be taught so the need to establish much tougher priorities in research made the former policy of benign pluralism out-of-date. Secondly, declining faith in the judgments of higher education and the more urgent need to harness scientific invention to technological change, and so to economic growth, led to much greater external interference in the setting of research priorities. The result has been a more and more insistent attempt to subject academic research to the disciplines of the "market". Lord Rothschild's grudgingly utilitarian "customer-contractor" principle ebbed and flowed, but essentially liberal principles of "timeliness" and "promise".

There can be little doubt that these two tendencies, the movement towards concentration - whether through SERC directives or SSRC designated research centres, and the growing power of lay customers - and of even more powerful surrogate customers, have seriously impoverished the range if not the quality of research in higher education. So long as the "customer-contractor" principle was complemented - some might

say, mitigated - by a still vigorous dual support system, there was some hope that a balance might be kept between fundamental and problem-solving research, between intellectual detachment and utilitarian commitment. It could be argued that "academic" research would continue to be supported out of the general revenue of higher education with its traditional confusion of teaching and research resources, while "applied" research would be determined on the basis of demand from customers. But the progressive erosion of the UGC-supported research "floor" in universities and, of course, the failure to provide any element for research at all in polytechnic and college funds have led to a situation in which the scope for independent, uncontracted-for research is very small and the customer has become over-mighty. This imbalance would matter much less if the "customer-contractor" principle itself was not subject to flawed ambiguity. The first difficulty is that many of the customers of research are in fact surrogate customers. In the case of the private sector this distinction matters much less because market-place competition is a reasonably effective trans-



mitter of the demands of the ultimate customers. But in the case of government, normally the monopoly provider of services that are often "positional goods" and sometimes part of complex and delicate political or cultural systems, this distinction is much more important. In the marketplace government may try to modify, divert, or even suppress the demands of the true customers.

This difference is important because in essence the Rothschild principle is that the customer defines the problem and the contractor then tries to solve it. In the natural sciences and engineering, where the normal customer is industry broadly defined, because the problems that have solved are usually interesting scientific problems this creates much less tension than with the social sciences, where the normal customer is "public policy", because here the really interesting intellectual questions are as likely to concern the definition of problems as their solution.

certainly be those institutions of present power that are most suspicious of intellectual novelty. Even in a pluralist and democratic society this is cause for some concern. The trouble with the post-Rothschild structure is that it places too much emphasis on the "timeliness" of research and too little on its "promise". An incidental trouble is that the "customer-contractor" principle has done nothing to reduce the sharply contested definitions of "timeliness", especially in the social sciences. So to allow this principle to become the organizing principle for all research in higher education would be a serious mistake. Yet as rival principles and practices in the organization of research atrophy this is happening.

How can this process be stopped? There are only two realistic strategies. The first is to try to revive the dual support system by redistributing money back to the UGC. Just to say what must be done is to emphasize its difficulty and even impracticability. On any likely projection of future public expenditure it is almost impossible to conceive of the UGC being given sufficient resources for such a restored dual support to be effective across all universities even in those disciplines where the costs of research are not too crippling.

One modification might be to allow only 12 or 15 universities an adequate research "floor" through a more selective dual support system and to abandon the pretence that significant research funding can be provided for the majority of universities as part of their general income. Whether such a policy of creating a research university super-league would be feasible against the background of the elitist egalitarianism of British universities, however, is very doubtful. It would also be a blunt instrument because departmental excellence is not aligned to institutional reputations.

The second strategy is the very reverse. This is to abandon the dual support system with its comfortable confusion of teaching and research money, and replace it with a dual supply system under which universities would receive funds for teaching and research quite separately (and separately from the support of specific programmes by research councils). This disengagement of research from teaching might in the long run have radical and even unwelcome consequences, stimulating the growth of research institutes on a much more systematic basis and encouraging the development of research-only or teaching-only departments. Its significance for undergraduate education would need to be carefully weighed.

But such a policy might have two good results. First, it would allow the development of more popular and more pedagogical forms of higher education that were not burdened financially or intellectually by some general research mission. Secondly, it would oblige higher education to address the fundamental questions that were never properly addressed in the 1960s. Then the dual support system by lumping together research and teaching may have seemed to underpin institutional and academic freedom. Today the "black box" of the dual support system - the "customer-contractor" principle - if the totality of higher education's research effort were to be considered rather than the "external" element from research councils, government, and industry, the limited and even restrictive utilitarianism of Lord Rothschild's principle would be more clearly exposed. Then it might be able to hope for a research policy that was more liberal in social terms and more progressive in scientific terms.

Laurie Taylor



Dear Professor Pogos, Thank you so much for letting me know that I have been reappointed as external examiner for the coming year. I don't actually remember seeking such a reappointment but of course feel appropriately honoured now the good news is here. You will know how much I look forward to returning to your department, particularly when it means that I'll be able to renew acquaintance with that delightful little band on the other side of town which with total insufficiency of verbiage and how very pleasant to once again meet your colleagues at the meal which you (or should you say your university) so generously provide on the evening before the examiners' meeting. That meal which you are always kind enough to allow me to provide most of the conversation and entertainment while your colleagues sit quiet around, reflecting, one presumes, upon the vagaries of the compulsory rota system which is responsible for their presence.

But these are small pleasures compared to the actual examiners' meeting. I hardly need to tell you how much I enjoy the manner in which I am routinely asked to legitimate some apparently minor matter (by an extra mark here or there) only to find later that this is really an issue which has split your department into two warring factions for the previous six months.

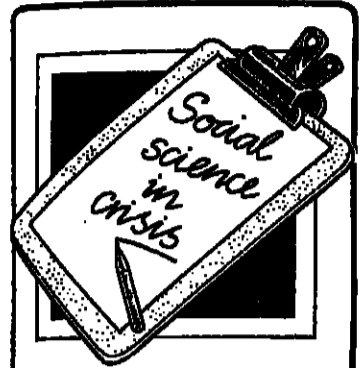
Then there is always the combing annual ritual of the debate about the relevance of medical evidence to the candidate's performance where your colleagues display such unexpected rhetorical skills, switching ceaselessly from side to side as they move through the candidates. What is also the moment, of course, when your own welcome reference to the finality of my judgement so much precedes the decision to take a vote. The satisfaction I derive from this meeting and the 11 subsequent joint meetings with other departments is adjudicate on combined degrees (of interest by the way, to discover that every other department has its own guidelines) is well complemented by the intellectual stimulation of the previous months.

First there are the questions to check. How wise you are in this context to emphasize the significance of the task by so astutely mistaking the ungrammatical with the meaningful, and the misspelt. And then, of course, the joy of joys, just four days before the actual examiners' meeting, the familiar sight of six Post Office research parcels which signify the arrival of the scripts themselves. My response to them means that I will again be able to admire your comprehensive, and may I say, selective, approach to the selection of scripts for my attention. Not only do you send every script one but you mix them all up with a clever disregard of the actual content involved.

Finally may I say how much I approve of your decision in these difficult financial times to retain my fee at the 1969 level of £90. I look forward to meeting you again on July 2, (although I appreciate that this date will be changed several times in the coming month). Yours sincerely, G. Lapping (Prof) P.S. I understand that the AUT is advising members not to continue with the Association of University External Examiners at those institutions which have enforced redundancies. What an appalling, unthoughtful, and I think it is thought this will be possible if next week's senate meeting votes against redundancies.

The Times Higher Education Supplement

March 26, 1982 No 490 Price 45p



The growing conflict, 9
 Zhores Medvedev on Soviet science, 12
 Tessa Blackstone on poverty, 14

Polyversity could be first of many

by John O'Leary and Paul McGill

Plans for the first comprehensive university in the United Kingdom, announced this week, received a guarded welcome as academics and politicians reacted with relief to a reprieve for the New University of Ulster. Fears that the university, at Coleraine, might be closed down or downgraded were dispelled with the publication of the Chilver report on higher education in Ulster and the Government's response. Against the wishes of the committee, NUU will merge with Ulster Polytechnic but retain its university status. The new institution, yet to be named, is expected to open in 1984 with a charter which emphasises a commitment to practical and technological work. The University Grants Committee is to hold talks with the Department of Education for Northern Ireland on forging a closer relationship in planning a wholly university based higher education system. Mr Nicholas Scott, the Northern Ireland Office minister with responsibility for education, stressed that NUU was not being downgraded and speculated that this initial breach of the binary line might lead the way for higher education in Britain. Although Chilver recommended a smaller free-standing but "new style" NUU based on teacher education, distance learning and part-time courses and dismissed a merger, Mr Scott denied that he was rejecting its main conclusions. "I am going

further down the road that he has suggested," Mr Scott said. He did not accept that the changes proved that sifting NUU in Coleraine had been a mistake and blamed its failure to attract students on sectarian violence. "I think this could be a very exciting development in higher education. It should be an innovative new institution and a genuine university," he said. Sir Henry Chilver was not available for comment on the Government's reaction to the report, but Dr Ray Rickett, chairman of the Committee of Directors of Polytechnics, who was a member of the committee, did not feel that insufficient regard had been paid to the recommendations. He said that the Government had simply extended and modified the proposals, which took three years to produce. Dr Rickett and Mr Derek Birley, rector of Ulster Polytechnic, welcomed the move as a weakening of the binary system. Dr William Cockcroft, vice-chancellor of NUU, reserved his position but other staff at the university said they welcomed the challenge of the new arrangements. The two main sites will be 50 miles apart and there will be a greater role for the Magee site of NUU, in Londonderry. A meeting was being held yesterday between the Association of University Teachers and the National Association of Teachers in Further and Higher Education to discuss the delicate membership implications for the unions. They were

likely to call for a joint meeting with Mr Scott. A statement from Natfhe criticized the Government's delay over Chilver's interim report on teacher education, which, the union said, should be linked with other higher education provision. Professor William Wallace, a member of the national executive of the AUT and former vice-chancellor at Coleraine, said the association was concerned that the Government was using the report as a means of restricting or even reducing expenditure on higher education at a time when Northern Ireland needed expanded opportunities. Certain conditions must be met before the AUT could accept a merger: the existing university-type functions of the New University of Ulster must be preserved, there must be no redundancies, the new institution must be funded to a level that would allow university quality staff for university quality work and there must be free negotiations between the two institutions and consultations with all trade unions. The president of the NUU Students' Union, Mr Bob Curran, gave the plan "a very guarded welcome". The Social Democratic and Labour Party welcomed the removal of doubt and uncertainty about the future of NUU and labelled the Government plan as "an exciting challenge in the field of third level education".

Details, page 3; leader, back page

Joseph hints at change in UGC status

by Ngalo Crequer and David Jobbins

Ministers may break a 60-year tradition of non-interference with a review of the relationship between government and the University Grants Committee. They accept the UGC has done its best to achieve the near impossible by embarking on a full scale restructuring of the university system in just three years. But they are sensitive to criticism of the UGC's lack of accountability and to complaints from backbenchers about the treatment of "their" university which they have to fend off in the Commons. He said he thought there was something in the criticisms made by Professor Frederick Crawford, the Aston vice-chancellor, about the make-up of the UGC and added, "I think there is some justification in saying that ministers should not distance themselves from the UGC's judgement, that we should have given guidance."

Mr Robert Rhodes James, the Conservative Party's liaison officer for higher education is sounding out vice-chancellors on how the UGC might be accountable. "But privately, ministers have said to the Committee of Vice-Chancellors and Principals that the UGC is working well and they have no criticisms to make."

Aberdeen to lose 57 jobs

by Olga Wojtas Scottish Correspondent

Aberdeen University this week formally announced a state of redundancy, declaring that at least 57½ jobs have to be axed. This is the necessary statutory step before redundancies for redundancy can be chosen and notices issued on July 11. The Association of University Teachers is now taking legal advice on whether it can prevent the unions from implementing redundancies on the grounds that it has acted in bad faith, and it is thought this will be possible if next week's senate meeting votes against redundancies.

round of cuts. Sir Keith said he did not intend to build an alibi but the decision was the UGC's, although ministers had been aware of chairman Dr Edward Parkes' views. "There was a clear awareness of the warning, but there was some disposition to assume a bad complexion was being put on what might happen," he said. "At this stage it was natural for the chairman of the UGC to make his warning very firm."

In a recent televised debate with Aston's vice-chancellor Sir Keith said he found it awkward to have to answer for the UGC when he did not know the reasons for their conclusions. He said he thought there was something in the criticisms made by Professor Frederick Crawford, the Aston vice-chancellor, about the make-up of the UGC and added, "I think there is some justification in saying that ministers should not distance themselves from the UGC's judgement, that we should have given guidance."

The Derby North MP will also stress the need for Oxbridge to correct the imbalance between the numbers of school-leavers admitted from the state and private sectors. He has visited Oxford several times recently to discuss admissions with senior academics and does not think progress is being made fast enough. Ten years ago 36 per cent of Oxford entrants came from independent and direct grant schools, and 42 per cent from state schools. Last year 47 per cent came from the private and direct grant sector, and 50 per cent from the state sector.

At that rate says Mr Whitehead it would still take the university 30 years for its intake from state schools to match the national proportion of state school sixth-formers, which is more than 70 per cent.



Labour threat to Oxbridge

The Labour Party is to increase pressure on Oxford and Cambridge to admit more students from state schools, supporting its pledge with a threat to review the legislation governing college autonomy.

Mr Whitehead believes the kind of deal undertaken by Wadham is complete abuse of the rights of college autonomy. "I do not for a moment believe this kind of deal stops with Wadham," he will say. "The university has already admitted there is no way it can monitor such arrangements nor can it compel Wadham to reveal details. The Derby North MP will also stress the need for Oxbridge to correct the imbalance between the numbers of school-leavers admitted from the state and private sectors. He has visited Oxford several times recently to discuss admissions with senior academics and does not think progress is being made fast enough. Ten years ago 36 per cent of Oxford entrants came from independent and direct grant schools, and 42 per cent from state schools. Last year 47 per cent came from the private and direct grant sector, and 50 per cent from the state sector. At that rate says Mr Whitehead it would still take the university 30 years for its intake from state schools to match the national proportion of state school sixth-formers, which is more than 70 per cent.

CNAA goes to crisis talks

The Council for National Academic Awards will attend a crisis meeting with Birmingham Polytechnic and the city council next week to discuss the threat to academic standards caused by financial cuts.

The polytechnic must axe the equivalent of three departments in the face of a £750,000 reduction in next year's budget. This follows the city council's failure to fund the shortfall between the advanced further education pool allocation and the 1982-83 estimates. The meeting in Birmingham next Monday will attempt to find a way of committing the city council to a longer term funding strategy which would help the polytechnic plan for the future.

The polytechnic's director, Mr Roy Hammond, said: "We hope the CNAA will be supporting the polytechnic's argument for a planning framework. At the moment we find it quite impossible to prepare some kind of plan without knowing what sort of contraction to expect in the future." The CNAA expressed concern about academic standards at the polytechnic after being given the broad financial picture and details of staffing limitations. Birmingham has now suffered a 4 per cent cut in pool income on top of a budget cut of £820,000 last year. During the past 12 months more than 60 vacant non-academic posts have been frozen and 34 out of 670 teaching posts left empty.

In a letter to Dr Hammond, the CNAA chief officer Dr Edwin Kerr sympathized with the city council's planning problems. But he added: "The alternative, to allow unplanned deterioration in the resource needs of the polytechnic, must raise questions about the ability of the institution to maintain standards." Three years ago the report of the CNAA quinquennial visit in June 1978 criticized the polytechnic for being badly underfunded and having no coherent policy for the future. The report casts doubts on the standard of academic work leading to the award of CNAA degrees. Support staff are lacking, it says. Staff and students now fear serious consequences when the CNAA makes another quinquennial visit next year.

Lecturers call for industrial action

by David Jobbins

College and polytechnic lecturers are to take industrial action in protest at a 2.5 per cent pay offer.

But the call from leaders of the main union, the National Association of Teachers in Further and Higher Education, is overshadowed by deep divisions over how, if at all, to wage the battle against the presence of the non-TUC Association of Polytechnic Teachers on the Burnham further education committee.

Natfhe members are being asked to consider an overtime ban, refusing to cover for absent staff, not working over holidays, and strict observance of the 30-hour week.

"In the event of a refusal by management to improve its offer Natfhe's executive will consider ways of escalating the action," a spokesman warned.

Natfhe has 73,000 members in colleges and polytechnics. It claimed 12 per cent and £250 across the board, but the management responded with a 2.5 per cent offer, said to be the lowest in the public sector in the current pay round. It was formally rejected by APT's representative, national secretary Dr Tony Pointon, after the teachers' panel walked out in protest at his presence.

Further negotiations are in jeopardy because of the complex row over the Government's decision to give APT an extra seat on the committee.

The teachers' panel was split even before that Burnham meeting four weeks ago.

Informed sources say two Natfhe members of the teachers' panel refused to attend the meeting to register a formal protest, and adhered to a strict interpretation of Natfhe's policy not to sit down with the APT. The two, Ms Sandy Grant and Mr David Triesman, refused to comment about the affair this week.

But the row surfaced at the union's executive at the weekend, when implicit criticism of the negotiators' tactics was put on the record. A motion endorsing the panel's action, normally a formality, was amended simply to note it, but by a slim majority of 17-16 votes.

Many of the executive feel that Natfhe's policy has been compromised and president Mr Malcolm Lee has called a special union council meeting for next week to reconsider the position.

Union leaders are anxious to find other ways of negotiating with the employers, who have made clear they will not engage in backstairs manoeuvres which imply overt rejection of Sir Keith Joseph's decision to give APT a seat.

Until Natfhe returns to Burnham the chance of an improved offer is remote, and next week's council could well be influenced to reverse the boycott decision.



Aberdeen University is to launch its own TV company which will produce films, videos and audio-visual programmes for commerce and industry in the north-east of Scotland.

The company, AUTEV, will use the production staff and resources of the university's television service which for the last six years has won the Royal Television Society Scottish award for the best educational television programme.

The production team has already been involved with several offshore projects, including helicopter safety, hydrocarbon gas detection and offshore medical services.

Professor Alistair MacLeary is chairman of AUTEV's board, and the directors include Aberdeen's former rector, ITN newscaster Sandy Gall, Professor Charles Gimingham. Above: Television service director Alan Grimley (hands folded in camera) and production head John Scoble (bottom centre).

Rothschild inspects accounts

by Paul Flaithr

Accountants have been sent to scrutinize the innermost operations of the Social Science Research Council by Lord Rothschild in his review ordered by the Government.

A team from Peat Marwick Mitchell has been interviewing SSRC staff and collecting statistics on financial, procedural and administrative practices. Sir Keith Joseph, the Secretary of State for Education, wants to know what work should continue to be done by the SSRC, and what would be better done by other bodies.

More than 250 submissions have landed on Lord Rothschild's desk, to add to the evidence collected through personal interviews and by telephone. Lord Rothschild said he wanted to finish collecting evidence this week.

Most of the submissions sent to The THES strongly support an enhanced SSRC, with some additional responsibility for long-term fundamental research currently done by Government departments. Most also welcome the review as a chance to clarify the SSRC's role, and to implement significant reforms. None want it abolished, and indeed they say it would simply have to be recreated in another form.

A report is expected sometime in May. Sir Keith has promised to publish the report and allow full debate on the findings.

Rothschild review, page 14

Researchers 'need watchdog'

The Social Science Research Council alone can act as an independent watchdog on the production of official Government statistics and surveys, according to evidence just submitted to the Rothschild review.

The department of social administration at Bristol University warns of the tendency of Government departments to develop in-house research at the expense of grants to outside research workers. This could obstruct innovative and critical types of research, it says. It would be wrong for Government to control too much on-going research, it says.

Professor Peter Townsend, who heads the department says a strong SSRC ensures the independence and criticism of Government statistics which a democracy requires.

Dr Miriam David, a department lecturer said: "We fear the lack of any critical statistics and the assumption that only the Government knows the kind of research that should be done. They may provide only partial information and distort the picture."

The Bristol staff urge Lord Rothschild to recommend the creation of a new independent SSRC unit to review the production of official statistics in the public interest, and to develop a new second survey research centre, independent of government and commercial interests. One research centre already exists at City University.

Another submission from Professor Martin Davies, head of social work at East Anglia University, discusses the question of censorship in research. He says an independent SSRC would counterbalance research by managerial teams who produce the answers they want.

Rates cut forces poly course to close

by Charlotte Barry

Sunderland Polytechnic has been forced to close its popular bridging course for students without formal entry qualifications because the local authority has withdrawn its £458,000 support from the rates.

The Labour-controlled authority has told the polytechnic it must cover the cost of non-advanced courses, normally funded directly by the local authority, out of its £9.9m advanced further education pool allocation.

The polytechnic governors decided reluctantly this week to axe the one year intermediate certificate course which caters for 80 students, many from overseas. They also agreed to reduce the intake on the art foundation course next year from 75 to 45.

At the same time the governing body imposed a minimum class level of 15 on all extra-curricular courses, but agreed to protect the part-time degrees courses in humanities, engineering, science and education.

Dr Peter Hart, the polytechnic's rector, said: "What the local education authority is doing may be legally possible but it is morally indefensible. I am taking the view that the advanced work whatever the local authority says."

Liverpool Polytechnic's governing body was this week considering a recommendation to cut half its books, materials and equipment budget at a saving of £600,000. The remaining £900,000 shortfall will be covered by a strict freeze on vacant posts.

Dr Gerald Bulmer, the polytechnic director, said he was forced to make these "crippling" cuts in the face of an inadequate pool allocation, and the city council's reluctance to introduce a premature retirement compensation scheme.

The college of higher education and the two teacher education colleges face cuts totalling £1.2m in spite of the city council's decision to provide £750,000 from the rates for the polytechnic and three colleges.

Westfield move favourite for merger

London University's Bedford College seems likely to merge with Westfield college on the Westfield, Hampstead site although Bedford is still conducting negotiations with the Royal Holloway in Egham.

The Westfield option is overwhelming the most popular and more plausible position. This week Westfield staff were informed of a letter from the principal of Bedford, Professor Dorothy Wedderburn, proposing a merger, but making it clear that the other talks were continuing.

The likely upshot is that about two thirds of the Bedford College will move to Westfield. Departments in doubt are Bedford's chemistry and physics as Westfield is transferring its own physics and chemistry to Queen Mary College, with whom it also has an arrangement for collaborating on arts.

A merger would create a college with a very strong arts faculty as well as strengths in biology, mathematics and computer science.

There has been speculation about the name of a possible merged college and one finding favour is "Westfield and Bedford College" at Hampstead.

A final decision is expected next week because of effect the continuing uncertainty is having on Bedford.

Paisley centre

Paisley College of Technology is to become Scotland's main centre for education and training for industry in the use of the most advanced computer-aided design and manufacturing techniques available in Britain.

Health minister says cuts damage unproven

Fears that posts frozen in the University Grants Committee cuts will have a dramatic effect on the health service are being investigated by the Commons select committee on social services.

But Mr Kenneth Clarke, Minister of Health, told the committee this week: "It is too early to come to any conclusion about the lasting impact on any of the health services."

There was evidence that the effects were as drastic as had been predicted. Returns from 16 of the 19 area health authorities with teaching responsibilities showed that 88 posts were frozen. Six were so important that the health authority was using its own funds to fill them. A further 29 had been designated as important by their authority and he admitted this meant the health service was being affected.

Sir Keith Joseph, Secretary of State for Education, said there was no evidence posts were being permanently frozen.

He disclosed that the chairman of the UGC, Dr Edward Parkes, had warned his predecessor, Mr Mark Carlisle, that clinical medicine could not continue to enjoy protection under the scale of the cuts being implemented. But he refused to give a commitment to restore this protection over the next two years.

Mr Clarke revealed that the chief medical officer at the Department of Health had written last October to the vice-chancellors expressing the Government's concern that certain specialised areas should not be hit.

"We have no evidence to suggest the shortage of specialities are actually being adversely affected," he said.

He added that ministers accepted there should be a standstill in student numbers. On the implications for research of bigger teaching loads and frozen posts, Sir Keith admitted that was a legitimate area for anxiety.

Although he agreed the "research floor" was being affected despite the UGC's efforts to protect the equipment grant, he made clear no more funds would be available to the research councils.

Auditors check UMIST spending

A team from the Auditor and Comptroller General's office, the watchdog on public spending, has begun a two week routine inspection at the University of Manchester Institute of Science and Technology.

Mr Brian Everett, regional officer of the Association of University Teachers, said this week that staff would be talking to the audit team about the funds spent on the residence, Highbank.

Aberdeen to lose 57 jobs

continued from front page

are estimated to be leaving through natural wastage or the voluntary severance scheme which closes on April 23.

The court has said it hopes to lose the 57 posts "as far as possible by voluntary means" but the compensation for voluntary and compulsory redundancy is at present identical.

Professor McNeill has said staff would be selected for compulsory redundancy under three criteria: their teaching, their scholarly standing, and their contribution to the running of the university. He praised the "extreme generosity" of Aberdeen AUTE's offer to forego a 6 per cent salary increase, but said this would not be enough to avert redundancies, and urgent negotiations must now be held with the branches implementing the court's decision.

But the branch denies that any compulsory redundancies are necessary. Refusing the salary increase of £600,000, it says, and this added to early retirement, voluntary severance and natural wastage would reduce the potential job losses to only 20.

This loss could easily be achieved through a work-sharing scheme, said Dr Jürgen Thomacke secretary of Aberdeen's AUTE, and he claimed the court was hell bent on redundancies without considering part-time employment.

A meeting was planned this week between court members, local AUTE members and AUTE's deputy general secretary, Mr John Akker.

The Chilver Report on education in Northern Ireland was rejected before it was published. Why? Merger ordered in Ulster

by John O'Leary

The Government's response to the Chilver report flinches its main recommendation, to restructure the New University of Ulster, and opts instead for a new system overturning binary traditions.

Mr Nicholas Scott, the Northern Ireland Office minister with responsibility for education, insisted this week that the committee's recommendations had not been overturned but extended. However, his own report, *Higher Education in Northern Ireland: the future structure*, is openly sceptical about Chilver's solution to the problem of NUU's continuing inability to attract students.

While agreeing with the committee's analysis of NUU's problems and prospects, and on the needs of the province, the Government reaches radically different conclusions about what kind of institution is going to be viable. It admits "several major reservations" about the report's plan for Coleraine.

Four are spelt out in detail:

- A reduction in degree level work would tend to make NUU even less attractive to well-qualified students.
- The Government does not accept that a reduced range of degree work would leave a suitable base for teacher education courses.
- What is described as "the unconventional mixture of future work envisaged for NUU" would lack coherence, encouraging conventional higher education to be concentrated around Belfast.
- Coleraine is not considered necessarily the best place to pursue an expansion of part-time work and of provision for mature students. Nor is disassociation from undergraduate courses thought desirable for such work.

Its conclusion on Chilver's scheme is: "It would mean a reduction in both the range and the academic level of NUU's work: would not in practice maintain much, if any, mainstream higher education provision in the north-west; and would be more likely to lead to a further rundown of the university than to its development as a thriving institution."

The Government rules out the transfer of courses on the same grounds as the Chilver committee, namely that many of the strongly vocational courses which flourish in Belfast have necessary links with that area, and that there is no guarantee that students would follow transfer courses to NUU.

Chilver's objections to a merger are overruled despite an acknowledgment that the difficulties confronting a completely new institution would be considerable. The Government considers it too pessimistic to conclude that administrative problems connected with a split-site would be insuperable.

There would be positive advantages in the concept of a merged institution and Belfast need not be dominant if there is a commitment to "geographical out-reach". There is said to be no reason for such a system to be lacking in flexibility.

Because it believes the talents of NUU and the polytechnic to be complementary while Queen's University is already the largest institution in the province with deep rooted traditions, the Government opts for a merger between NUU and the polytechnic.

The Government statement stresses: "If the merger is to be successful, it will be important to establish

three major freestanding institutions in Ulster. However, it acknowledges the desirability of maintaining a geographical spread of provision across the province.

Although a rationalization which returned the entire responsibility for higher education to the Belfast area would be the cheapest solution, it would mean serious economic, social and cultural loss to the area. The Government accepts that closure of NUU would be a last resort.

However, the status quo for the university is dismissed as "a blind alley" and rules it out of consideration. Instead, "the future structure" considers two alternatives: the transfer of courses from either the polytechnic or Queen's University, Belfast, to Coleraine or a merger of two of the three institutions.

The Government rules out the transfer of courses on the same grounds as the Chilver committee, namely that many of the strongly vocational courses which flourish in Belfast have necessary links with that area, and that there is no guarantee

for Northern Ireland students, historically greater than for Great Britain students, is currently around 15.5 per cent. Chilver estimates that it could vary over the next two decades by as much as plus or minus two percentage points, giving a range of between 13.5 and 17.5 per cent.

Chilver assumes that the number of Northern Ireland students who take up higher education outside the province, now about 30 per cent, will continue.

It comments that the low inflow of students to Northern Ireland in recent years is mainly due to the civil unrest, but that an improved political and social climate might make the province more attractive.

It notes that the cutbacks in mainland institutions may have two effects: as Northern Ireland students who win Great Britain places tend to have above average qualifications, they would be well placed in the increased competition.

It says higher education in Northern Ireland may need special policies, it restates Robbins, it wants flexibility and quality, strong coordinating machinery for efficiency and no greater concentration on Belfast.

Survival depends on adopting a new role

by Paul McGill

The final report of the Chilver committee recommended the New University of Ulster be retained, but only if it implements fundamental changes in its policies and activities.

Both government and the review group chaired by Sir Henry Chilver agreed that serious problems existed at the Coleraine campus. Most central was the failure of the NUU to expand as planned in the last major review of higher education in Northern Ireland, the Lockwood report in 1965. It recorded that enrolments rose to a peak of 1,913 full time equivalents in 1976/77, falling to 1,836 in 1980/81, compared with Lockwood's target of about 6,000.

Chilver concludes that "there is little doubt that NUU in recent years has not been attractive to well-qualified young new entrants" and it points to the decline in subjects such as biological sciences and mathematics.

The report reveals that only 20 out of the 323 students with A levels in 1980 had high scores, whereas 194 had low scores. About 17 per cent of the university intake in recent years had come through clearing.

One result of the failure to build up numbers is that NUU has "abnormally high student staff ratios in several subjects, such as 3.3:1 in biological sciences compared with an average of 8.8:1 in all British universities. In maths NUU has 2.9 students per member of staff compared with an average of 10.6 and in arts the ratio is 9.9:1 compared with an average of 10.3:1.

The ratio means that the unit costs are often higher than those in Britain. The greatest disparity is in mathematics where the cost per student in Coleraine is £4,366, compared with just under £1,300 in Britain; in biological sciences NUU is more than double the British average - £4,946 compared with £2,455.

Chilver considers five options for the university. One of which, disinvestment of NUU as it stands.

Another is the transfer of courses from one of the Belfast institutions, but here the report says that growth at NUU must be generated by the university's own efforts.

The review group considered closure, but concludes it would be "an option of last resort". It points to the cultural, geographical and social imbalance in Northern Ireland which would result from all higher education being concentrated in the Belfast area.

It argues that three major institutions gives more flexibility in terms of numbers and academic styles. The advantages of a teacher-education base in the north-west would be lost and some of the financial savings from closure would be offset by the



Sir Henry Chilver: changes needed

need to compensate staff and to provide the same facilities elsewhere.

Instead it favours a fundamental change in the university's model of operations in an effort to keep it open. And it warns that even now the university's survival "must depend essentially on its ability to attract students to identify newly-emerged needs and to respond quickly and flexibly to them."

It recommends a new policy under which NUU will increase its concern with mature students, who constituted 41 per cent of the 1980 intake, greater emphasis on activities relevant to the needs of the Northern Ireland community and the development of distance learning, probably through a link-up with the Open University.

Under this strategy the university would shed much of its degree work, especially in the physical and biological sciences.

The fifth option which was considered, but rejected, was merger with one of the Belfast institutions - the solution adopted by the Government. Chilver argues that many of the problems at NUU relate to the difficulty of maintaining a small self-contained institution.

In addition, a merger might also disrupt the functioning of the Belfast institution involved. It would tend to increase the dominance of the Belfast colleges, where so much of Northern Ireland's higher education provision is already concentrated.

"We see no point in losing an element of flexibility - is a different style of operation and of management - and we feel that if NUU is to be retained at all it is better that it should be retained with separate management," it said.

The Future of Higher Education in Northern Ireland (Chilver report) Belfast, HMSO, £6.50

Higher Education in Northern Ireland: The Future Structure (Government proposal), Belfast, HMSO, £2.00

Demand for places could fall

by Ngagio Crequer

The Chilver report is reluctant to predict precisely the future demand for higher education in Ulster.

It suggests that demand in 1985/86 for full-time places could fall within the range of 13,000 to 14,000, dropping to between 12,500 and 14,000 in 1990/91, then to between 10,500 and 12,500 in 1995-96 and possibly back to between 11,500 and 14,000 in the year 2000.

But it accepts the uncertainty and range of its own figures and prefers planning in which flexibility is assumed. The age participation rate

Survival depends on adopting a new role

for Northern Ireland students, historically greater than for Great Britain students, is currently around 15.5 per cent. Chilver estimates that it could vary over the next two decades by as much as plus or minus two percentage points, giving a range of between 13.5 and 17.5 per cent.

Chilver assumes that the number of Northern Ireland students who take up higher education outside the province, now about 30 per cent, will continue.

It comments that the low inflow of students to Northern Ireland in recent years is mainly due to the civil unrest, but that an improved political and social climate might make the province more attractive.

It notes that the cutbacks in mainland institutions may have two effects: as Northern Ireland students who win Great Britain places tend to have above average qualifications, they would be well placed in the increased competition.

It says higher education in Northern Ireland may need special policies, it restates Robbins, it wants flexibility and quality, strong coordinating machinery for efficiency and no greater concentration on Belfast.

PICK OUR BRAINS

The Sharp PC3201.

The computer created for business and industry, incorporating a screen for crisp, clear information, a twin disc-drive printer to enable you to keep everything in black and white, and a C.P.U.

The Sharp MZ80B.

The computer that offers the educationalist and the scientist many of the features previously associated only with larger, more expensive products.

Here is the versatility you need to handle a huge range of software and hardware applications.

The Sharp MZ80K.

The computer designed for improving efficiency in small businesses, widening the learning spectrum in educational establishments, and adding to the pleasure for the home enthusiast.

Please send me further information on the:

MZ80K PC3201 MZ80B

Name _____

Address _____

City _____

Postcode _____

Telephone _____

SHARP

First, and foremost

Sharp Electronics (UK) Ltd, Sharp House, Thorp Road, Newton Heath, Manchester M10 9JZ. Telephone: (061) 405 2333.

Aston refuses to make extra student cut

by Ngaio Crequer and David Jobbins
Aston University senate last week rejected a proposal for a further reduction of 300 student places, on top of the 1,000 already recommended by the University Grants Committee.

The intention had been to raise the A level grades of some of the students and increase the unit of resource. The UGC had said it would not reduce the Aston grant if there was a modest shortfall on the 1983/84 numbers.

The senate meeting was adjourned to this week, when it was expected to discuss a proposal to increase overseas student fees by 20 per cent. The increases (on the old recommended UGC minima) would put arts fees up to £3,000 and science up to £4,320. The new UGC recommended fees are £2,700 for arts and £3,600 for science.

Sixteen per cent of Aston's students are overseas and only City, Essex and the University of Manchester Institute of Science and Technology have higher proportions. The University of Surrey is having second thoughts about the closure of a home economics course, highly regarded in the catering industry.

Last week the senate voted by 24 to 20 to halt the 1982 intake. This angered staff in the department, which according to the university is not under a threat of closure, and provoked students into a 24-hour occupation.

News in brief

Sheffield to avoid South African jobs

Sheffield has become the first university officially to disassociate itself from all recruitment for jobs in South Africa.



Neil Kinnock: education a right

Kinnock calls for wages for students

by Olga Wojtas
Scottish Correspondent
Mr Neil Kinnock, chief opposition spokesman on education, revived the student wage as one of the Labour Party's long-term objectives, while campaigning for yesterday's Hillhead by-election.

He accused education minister Sir Keith Joseph of introducing student loans "through the back door in the dumbest, cruelest form," by forcing students to have overdrafts.

Mr Kinnock, speaking at Glasgow University said the 4 per cent raise in the student grant, and the resulting increased dependence on parental contributions was regressive and unfair, since many parents would be unable to pay.

Mr Kinnock also condemned the national cut of 13 per cent in student intake, and said there would be a dramatic loss of educational opportunities in Glasgow, with more than 1,100 places being lost from Glasgow and Strathclyde universities, and a 26 per cent cut in secondary teacher training intake at Jordanhill College, Britain's largest college of education.

The Labour Party would never introduce a system of student loans, Mr Kinnock said. He would like to fulfil his long held hope of providing a student income "in the form of a wage earned by people undergoing education and training which is essential to a productive and civilized society".

Such a scheme would take time and money and could not be achieved quickly, said Mr Kinnock, but it was ultimately the only satisfactory way of recognizing that higher education was neither a luxury nor a privilege, but a necessity and a right.

Mr Kinnock also condemned the national cut of 13 per cent in student intake, and said there would be a dramatic loss of educational opportunities in Glasgow, with more than 1,100 places being lost from Glasgow and Strathclyde universities, and a 26 per cent cut in secondary teacher training intake at Jordanhill College, Britain's largest college of education.

Mr Kinnock also condemned the national cut of 13 per cent in student intake, and said there would be a dramatic loss of educational opportunities in Glasgow, with more than 1,100 places being lost from Glasgow and Strathclyde universities, and a 26 per cent cut in secondary teacher training intake at Jordanhill College, Britain's largest college of education.

Mr Kinnock also condemned the national cut of 13 per cent in student intake, and said there would be a dramatic loss of educational opportunities in Glasgow, with more than 1,100 places being lost from Glasgow and Strathclyde universities, and a 26 per cent cut in secondary teacher training intake at Jordanhill College, Britain's largest college of education.

Mr Kinnock also condemned the national cut of 13 per cent in student intake, and said there would be a dramatic loss of educational opportunities in Glasgow, with more than 1,100 places being lost from Glasgow and Strathclyde universities, and a 26 per cent cut in secondary teacher training intake at Jordanhill College, Britain's largest college of education.

Mr Kinnock also condemned the national cut of 13 per cent in student intake, and said there would be a dramatic loss of educational opportunities in Glasgow, with more than 1,100 places being lost from Glasgow and Strathclyde universities, and a 26 per cent cut in secondary teacher training intake at Jordanhill College, Britain's largest college of education.

Mr Kinnock also condemned the national cut of 13 per cent in student intake, and said there would be a dramatic loss of educational opportunities in Glasgow, with more than 1,100 places being lost from Glasgow and Strathclyde universities, and a 26 per cent cut in secondary teacher training intake at Jordanhill College, Britain's largest college of education.

Mr Kinnock also condemned the national cut of 13 per cent in student intake, and said there would be a dramatic loss of educational opportunities in Glasgow, with more than 1,100 places being lost from Glasgow and Strathclyde universities, and a 26 per cent cut in secondary teacher training intake at Jordanhill College, Britain's largest college of education.

Drama teachers reject UGC reasoning

University drama lecturers have rejected the University Grants Committee's explanation for ordering the closure of seven out of 19 drama departments and other cuts which would affect drama.

Letters released this week reveal the criteria used by the UGC to make cuts in the arts. They say drama in universities is "over-provided for" and this cannot be justified because of relatively high costs.

The letters from Dr Edward Parkes, the UGC chairman, and Professor R. J. C. Atkinson, chairman of the UGC arts subcommittee, were sent to the Standing Committee of University Drama Departments (SCUDD) to explain cuts which threaten a third of all university drama.

At least damage would ensue from the selective closure of the most expensive arts departments. These are archaeology, drama, fine art, history of art, and music.

War veterans fight for pensions

by Ngaio Crequer
A small group of academics have organized a campaign to protest against war service being excluded for their pension purposes.

About 200 academics who decided to join up during World War II rather than carry on with their studies are now suffering the financial penalty.

At the insistence of the Civil Service Department, war service for academics only counts towards pensions if the first university job had been taken up by June 1950. So those who set aside their studies may have lost up to six years of pension rights.

The demobilization of some was delayed because of lack of troopships. Some specialized personnel were retained instead of being released "first in, first out".

Handful of redundancies at Dundee

Dundee University court has warned that up to 15 academic redundancies to take effect in December 1983 may be declared in July.

The court has accepted the recommendation from the university's special committee that the department of medical biophysics be dissolved, with the loss of four posts, which it says will be achieved through early retirement, redeployment or redundancy.

Other posts earmarked for compulsory redundancy are up to four in medicine and dentistry, up to five in science and up to two in the library.

A circular from the court said it would hope that voluntary measures, including redeployment, would reduce the number of redundancies necessary, but says that 66 staff members have agreed to accept early retirement or voluntary redundancy and the court feels there is little scope for further savings in these areas.

Union representatives 'miss crucial meetings'

Trade union and labour movement representatives on university governing bodies have been criticized for missing crucial decisions on redundancies.

The attack came at the TUC Women's Conference in Bournemouth from Dr Margaret Majumdar of the Association of University Teachers in a brief but inconclusive debate on the implications of the higher education cuts for women.

Dr Majumdar told delegates: "Some representatives of trade unions and labour councils do not attend meetings of governing bodies - or if they do they leave before decisions are taken - even on the jobs of trade union members."

"Very few go near the university except on the day of the meeting. Maybe the trades council or labour group appoint someone not because of his or her interests but because they have not got their quota of jobs. We must make sure all representatives do the job they are appointed to do."

WEA looks for fees deal

The Workers' Educational Association is facing a new financial crisis only a year after the Government bailed it out with a £58,000 supplementary grant.

University extra-mural departments hit by the cuts are threatening to keep up to half the fees collected from adult students on liberal studies programmes run jointly with the WEA.

Traditionally the extra-mural departments have allowed the association to keep all the fee income from these classes in recognition of the WEA's efforts in promoting university courses.

Delicate discussions are taking place between the WEA and the Universities Council for Adult and Continuing Education to get a formula. Any agreement would be used as a reference point in local negotiations between WEA districts and extra-mural departments over fee levels, income distribution and the size of joint class programmes.

Economic forecasting groups urged to marry

Proposals to set up "arranged marriages" among some of the top economic forecasting groups in Britain were discussed this week by senior economists meeting in London to judge applications for funds worth £750,000 a year.

The SSRC contribution to the consortium is also likely to be cut back in future years, partly because of the unforeseen cut in the SSRC budget imposed at Christmas, and partly because the SSRC is committed to fund a new centre for evaluating forecasting.

Staff reject 4 per cent

The staff side of the new Scottish further education negotiating body have rejected the offer of a 4 per cent salary increase and are continuing to press for 11 per cent.

These are the first joint pay negotiations for the 7,000 further education lecturers, college of education lecturers and central institution staff.

Union forced to foot bill

Students at Sussex University have failed to persuade the authorities to reduce a £15,000 bill for the indirect costs of a two week occupation which came close to bankrupting the union.

ing enabled the university to deduct the costs from the block grant payments to the union.

Polys consider using clearing house

by Charlotte Barry
Polytechnic directors are considering the creation of a central clearing house to deal with the unprecedented flood of students applying to courses.

CDP. Dr. Kay Rickett, said: "It has become clear that some of the more able pupils are now applying to polytechnics and there are good reasons why students should be dealt with in a more structured manner to allow them to get into the polytechnic of their choice."

ARTS TO PREVENT NUCLEAR APOCALYPSE



Art forms a protest

The White Brand, one of the paintings by a French-born Tahitian artist, Jaé, currently on tour around student union buildings in London.

Staff reject 4 per cent

The staff side of the new Scottish further education negotiating body have rejected the offer of a 4 per cent salary increase and are continuing to press for 11 per cent.

Vcs prepare pay position

University employers are expected to give the first indication next week of what they can afford in the coming pay round.

New College rector

Lord Crowther-Hunt, a former minister and a life peer, has been elected rector of Exeter College, Exeter, from October 1. He succeeds Mr Greig Barr, aged 64, who is to retire after 10 years in office.

Journal launched

A new journal concentrating on the historical dimension of social research, immigration, racial studies, minorities, and the responses of receiving societies towards new migrants and Minorities (published by Frank Cass) will appear three times a year, and is edited by Colin Holmes of Sheffield University and Kenneth Lunn of Portsmouth Polytechnic.

Merritt stays on

Mr Neil Merritt, Director of Exeter College, is to remain chairman of the Standing Conference of Directors and Principals of Colleges and Institutes in Higher Education for an unprecedented third year.

Afghans get help

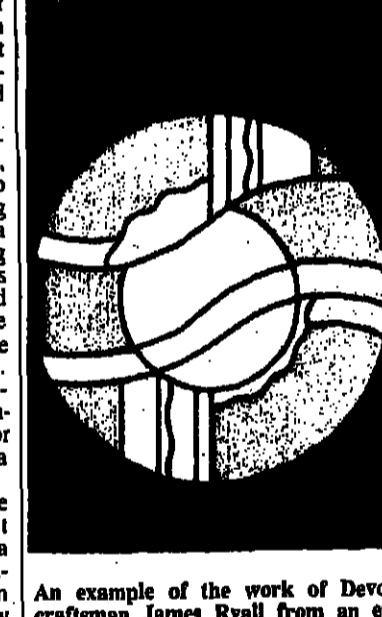
The Overseas Development Administration is to sponsor 20 Afghan refugees, presently in Pakistan, on further and higher education courses in Britain next year.

Computer talking

A talking computer system developed by the Open University is to be used in schools and colleges for the blind with the help of a grant from the Department of Industry and the Microelectronics Education Programme.

Library expands

An appeal to former students of the sex University has been made to expand its collection of publications by former undergraduates.



An example of the work of Devon craftsman James Ryall from an exhibition of his stained glass mounted by Plymouth Polytechnic's School of Architecture at its Hoe Centre exhibition site.

North American news

Universities fight budget

from Peter David

WASHINGTON The campaign against President Reagan's proposed cuts in higher education reached a crescendo last week with coast-to-coast protests by university presidents and an intensive congressional lobbying campaign in Washington.

Presidents of the eight biggest universities in New York State sent a joint letter to the 41 senators and congressmen representing the region claiming that the cuts would "smash the American dream" and hit New York harder than any other part of the country.

The new proposals by the administration go far beyond austerity or programme reform. They are a repeal of the principle that the financial status of a student and his family should be no barrier to higher learning," the letter said.

It added that the cuts in student aid "threatened a return to a darker era when wealth was prerequisite for higher education."

The letter was signed by the presidents of the City University of New York, New York University, the State University of New York and the universities of Columbia, Cornell, Fordham, Rochester and Syracuse. It pointed out that students in the state borrow one out of seven guaranteed student loans (GSL) issued nationally. They would lose \$179m of aid as a result of cuts in

the four other loan and grants programmes marked for severe cuts by the administration.

In an analysis of how the cuts would affect each institution, the presidents said that the City University of New York would see need-based aid to students decline from over \$90m to less than \$60m under the Reagan budget.

Syracuse University, projecting a loss of \$8m from the 10,000 aid recipients at the institution, said: "It simply will not be possible to sustain an economically diverse student population if these budget plans are adopted."

In President Reagan's home state of California, a joint statement by university leaders and higher education associations said the proposed cuts threatened the nation's ability to produce an informed citizenry.

At a news conference at the state capital the group estimated that financial aid for the 1.5m students in California's private and public universities would drop by \$6 per cent from \$290m in the current year to \$131m by 1983.

More than a quarter of a million students would be affected and the number of grants would drop from 485,000 to less than 200,000.

The statement continued: "these cuts will damage the ability of educational institutions to respond to national needs, even if the cuts are reversed later in this decade."

"It is difficult enough to eliminate a talented and experienced corps of teachers and faculty, but it is far easier to eliminate than it is to rebuild. It will take years to re-establish the educational aspirations that these cuts will destroy in a matter of months."

In New Hampshire Mr David McLaughlin, president of Dartmouth College, warned last week that there would be a rash of university closures in New England if the cuts were implemented.

In Washington, a coalition organized by the National Council of Educational Opportunity Associations met congressmen to protest against cuts in the "trio" programmes designed to help minority groups and the educationally disadvantaged gain access to higher education.

Under the Reagan budget, more than 340,000 of the 500,000 students currently aided would cease to receive tuition and counselling, the council claimed. Special programmes to aid postgraduate and legal students would be eliminated entirely.

But in testimony to a senate appropriations committee, spokesmen for the Department of Education defended the 1983 budget proposals. Mr Edward Elmendorf, deputy assistant secretary for financial assistance, said the GSL simply had to be cut to prevent an 850 per cent "explosion" in its cost over a six-year period.

Cuts in student aid may be prevented

from our North American editor

America's university lobbyists have won the opening skirmishes of their congressional campaign to avert the cuts of more than 40 per cent in student grants and loans called for in President Reagan's 1983 budget.

In the House of Representatives last week, the Democrat-controlled Labour and Education Committee voted to authorize nearly twice the amount of money for student aid asked for by the White House.

Recommending that the administration raise taxes instead of cutting social programmes, the committee split on party lines to vote \$900m for student aid, nearly \$5,000m more than earmarked in the president's budget.

The committee also rejected the White House plan for big economies in the Guaranteed Student Loans programme. It earmarked \$3,900m for the GSL instead of the \$2,400m recommended by the administration.

But the committee's vote was only the opening gambit in a convoluted budget process which either side could win. And in the Republican-controlled Senate higher education's supporters won only a partial victory.

The Senate Labour and Human Resources Committee, which is responsible for authorizing higher education spending, has so far been unable to reconcile a split between supporters and critics of the president's budget plan.

Last week four members of the committee (Liberal Republicans Robert Stafford and Lowell Weicker, and Democrats Claiborne Pell and Jennings Randolph) bypassed the full committee and produced their own recommendations for a higher education budget substantially bigger than the president's.

Like the 'house committee, the four senators argue to keep spending on loans and grants at about the present level. They claim that President Reagan's proposed cuts in the "pell" grant programme would reduce the recipients by 1.2m and they reject the administration's proposal to reform and reduce the GSL programme.

In a letter to the Senate Budget Committee, which is responsible for setting global spending targets under each budget head, the four describe the administration's proposal as "especially ill-conceived" and "an administration's proposal to disqualify 600,000 postgraduates from CSL eligibility."

The letter adds: "The administration's alternative is to allow graduate students to increase their borrowing limits under the higher interest, non-renewable loan programme, which now exists in only 13 states and in which only 5 per cent of loans have been made to students as opposed to parents."

There are plenty of other signs that members of congress oppose the deep higher education cuts sought by the president. Twenty-six senators and 63 members of the House have tabled resolutions opposing the plan to remove postgraduates from the GSL programme.

The House Science and Technology Committee last week called for a \$30m increase in the administration's allocation to the National Science Foundation and recommended \$14m from hard science areas to the behavioural and social sciences.

In the House Health and Human Services Appropriations Committee, members ignored administration requests for GSL economies and voted a \$1.30m supplement grant to the loan programme for the rest of 1982.

Much as this string of successes has pleased the higher education community it does not guarantee that at the end of the protracted budget negotiations President Reagan will fail to get all or at least most of the student aid cuts he is asking for.

Specialist committees traditionally vote for high spending in their own areas. The next step in the budget process is for the budget committees in the house and senate to reconcile the recommendations to the specialist committees and draw up global spending targets for each main area of public spending.

These first budget committee resolutions are expected to go to a vote on the floor of congress in late April. The great fear of the higher education community is that the major problems of the universities will then be swallowed up in the general political question of the president's strategy of a high-deficit budget and continued rises in defence spending.

If the president succeeds in setting his budget strategy to the liberal Republicans and "blue wave" Democrats who supported him last year, Congress will have little choice but to find large economies in student aid as in other domestic spending.

Campus guide angers some

A hard-hitting consumers' guide to American universities has provoked such outrage amongst some institutions that its publisher, The New York Times, has decided to remove its imprimatur from future editions.

Published last February as The New York Times Selective Guide to Colleges, the 432-page book contains outspoken descriptions of America's leading institutions and uses a Michelin-style star rating to grade colleges.

Based on surveys of students and on campus visits and written by the Times education editor Mr Ed Fiske, it adopts a punchy, journalistic style unlike the more formal college guides published in the United States or Great Britain.

Students at the University of Arkansas Fayetteville, for instance, are described as "small-town, 1950s main street variety whose world view is formed by sports, cliques, and cruising the local burger joint."

The nation's leading universities do not escape unscathed. The best-known scholars at Harvard are said

to be inaccessible figures who get little attention to teaching. The English department is "stodgy and old-fashioned."

While the Ivy League schools have been able to laugh at the book's opinions, reaction amongst less famous colleges has been less laudatory.

With federal funding scarce and competition for students high, universities criticized in Mr Fiske's book fear their enrolments could be affected by an adverse mention.

The president of Colby University felt so strongly that his institution had been underrated that he visited Mr Fiske at the Times to argue that Colby deserved at least four stars instead of the three it was awarded.

Mr Fiske agreed and promised to incorporate the change in later editions.

Although The New York Times regards the book as a distinguished enterprise, it would omit the newspaper's name from future editions to make it clear that the controversial opinions belonged to Mr Fiske and not to The New York Times.

California to set higher standards

The University of California plans to introduce more rigorous entrance requirements. The changes, recommended by a Senate committee, will come into effect in 1985 if it is approved by the university's board of regents.

Designed to assure that applicants have completed a rigorous academic programme at high school, the rules will raise from 11 to 16 the number of year-long courses they must have pursued at high school.

Overseas news

Consultancy work fills empty coffers

from Geoff Maslen

MELBOURNE

Australian universities, under financial siege by the federal government, have begun to turn to the market place to raise funds.

The University of Queensland is to set up a company to sell its academic expertise to commerce and industry. The new service is expected to have strong appeal to commercial organisations not large enough to have their own research and development departments, or which do not have highly specialized equipment or staff available for them for design and testing purposes.

The scheme will also coordinate and regularize departmental research efforts to conform with the university's policy on consultative work.

The vice-chancellor of the university, Professor Brian Wilson, said the idea had a lot of potential. The size and complexity of the university often stopped small companies from seeking help, he said. The company would help the outside community realize that universities had something to offer.

Queenland's move follows the establishment of a similar organization, Unisearch Ltd, sponsored by the University of New South Wales. The general manager of Unisearch told the University of Queensland that the company would welcome the setting up of a similar organization in Queensland.

At least 12 departments at the University of Queensland already provide testing services. Seventy per cent of funds generated by consultancy activities would be passed on to the departments, 20 per cent to university research funds and 10 per cent to administrative costs.

At the Australian National University, an A\$80,000 (£46,000) contract between the university and a private company in Finland will allow work to begin on a new radiocarbon dating system capable of handling small samples. The contract gives manufacturing and patent rights to the company, with the university receiving royalties of 3 per cent of profits. The deal will allow the university's research to move into the Development Stage - a jump it would have found impossible without outside commercial help.

The aim is to develop a radiocarbon dating system which will greatly extend the application of existing techniques to prehistory and environmental research in Australia.

Under the joint project the university will provide A\$80,000 in 1982-83 with an equal sum from the Wallace Oy Company of Turku Finland. The development work will be carried out in Finland in conjunction with Australian academics.

Far smaller samples can be dated using accelerator mass spectrometry but the drawback here is that the accelerators are expensive and only nationally funded research centres have set them up. The ANU-Finland project is to give an alternative and cheaper lead into the field of small sample carbon dating.

Socialists propose Bill for greater university autonomy

from Guy Neave

PARIS The famous guideline law passed in the aftermath of May 1968 is shortly to be replaced. This was announced recently by the Minister of Education, Alain Savary, speaking at a meeting of 500 university professors and lecturers at Lyon.

The Socialist Party proposals for the future of higher education if passed will make the system far more open, less rigid and centralized.

The groundwork of the initiative was well laid. In December, a working party was set up, headed by Claude Jeantet. M Jeantet is a lecturer at the Experimental Centre of Marseille Larnay and a Socialist Party specialist on higher education.

University autonomy is to form the cornerstone of the future legislation, and diversity is to be the aim. In future, demarcation lines between university and short-cycle higher education, are to be less rigidly drawn. Short-cycle institutes, the

minister suggested, should be able to take part in fundamental research, an area they have been discouraged from venturing into.

Higher education should be encouraged to develop a more flexible approach not only to questions of curriculum development, but also in its relationship with the region, said M Savary. Central government would retain control over staff appointments, degree validation and the promotion of academics.

The minister took up certain ideas from the last government. Among them the notion of allowing greater financial autonomy.

Universities have been asked to improve both basic and in-service education. The latter was a major point in the Socialist Party's election manifesto.

Savary wants the Bill through the National Assembly this autumn. It will have to be drafted before the end of June and all comments on the proposals will have to be in by May.

Romanians try to build up academic contacts

The Romanian ambassador to Britain, Mr Vasile Oliga, last week paid what was described as a "courtesy visit" to the Royal Society.

His visit seems to have been inspired by a growing realization that, as a result of the restructuring of Romanian science during the last 15 years, scientific academic contacts between Romania and the West are rapidly deteriorating.

The visit came just a few days after the regular meeting in Bucharest of the UK-Romanian joint commission on trade and technological exchange at which Romania was looking for closer and more prolonged technological cooperation.

The British were reluctant. Past experience has shown that all projects become simply a one-way flow of information or else get bogged down in bureaucracy.

With British Airways cancelling these Bucharest services from the end of March, stronger academic links are seen as a way of maintaining contacts.

does not distinguish between research, education and production. This has led to the run-down of pure research with only 10 per cent of the total research budget going on "fundamental" research.

This must be closely linked to the needs of the economy. For example, work on genetics has to be linked to the needs of agriculture, higher mathematics to the computerization of production, and history to the "deepening of socialist democracy."

No funds are available for research into interesting new phenomena for which no application can be found. All research must be linked to the "Single National Plan of Economic and Social Development."

University teaching staff have to spend around a third of their time on research linked to the plan with no extra pay.

At the same time undergraduates who have to combine work training with academic study have no link with their future employment as in neighbouring Bulgaria, where the last 18 months of undergraduate studies are spent between campus and



A demonstration last month in the nearby town of Ramallah to protest at the closure of Bir Zeit University.

MPs call for debate on Bir Zeit

The Israeli government is likely to impose conditions on the reopening of Bir Zeit University next month and to insist on further visits to the campus by representatives of the civil authority in the West Bank, lecturers from the university told a press conference in the House of Commons last week.

Seventeen MPs from all parties signed an Early Day Motion calling for the reopening of Bir Zeit and the protection of academic freedom. The motion coincided with a visit to Britain by Dr Khalil Mahshi and Mr James Cornick, both lecturers at Bir Zeit, who were publicizing the plight of the university, which has been closed twice in the last six months.

The university is due to reopen on April 16, following a two-month closure order imposed after disturbances on the campus soon after its last reopening in January. Mr Cornick, an English lecturer in his first year at Bir Zeit, accused the Israeli army of harassment and provocation of students and denied claims that the university was dominated by the Palestine Liberation Organization.

Foot first on the accelerator

from Michael Blynov

MOSCOW The Russians have announced they are to build the world's biggest and most powerful particle accelerator, up to six times larger than any one in Western Europe or America. By 1990, Tass said, Soviet scientists hope to be able to accelerate elementary particles to energies of three trillion electron volts.

The project has already begun at the Vekovno Research Institute of Electrodynamics Apparatus near Leningrad. It will consist of a circular tube over 13 miles long in which particles are brought into collision so that they form smaller particles of matter through fusion.

The complex is to be built in two stages, and each can be used independently. Mr Vasily Gukhikh, the institute's director and a member of the Soviet Academy of Sciences, said the accelerator will allow physicists to produce and watch a collision of particles with energies of up to six to ten trillion electron volts.

Mr Gukhikh said physicists had been able to establish that the nuclei of atoms were made up of at least 350 particles but hope to learn more about the make-up of matter from the new device. Nuclear fusion has been seen as a possible new power source, and the Russians have a number of research programmes on this in collaboration with foreign scientists.

Liberal dons cold-shoulder segregated township colleges

from Craig Johanne

JOHANNESBURG Preparations are advancing rapidly for the opening next year of Vista University, South Africa's new system of "township colleges" for urban Africans.

The institution is expected eventually to triple the number of university places now available to Africans at South Africa's white universities and black "bush colleges" but its adherence to the principle of segregated education has made it controversial from conception.

It is expected that seven branches will admit students at the start of the academic year in January: Three in the Johannesburg area, along with others in Pretoria, Port Elizabeth, Vereeniging and Bloemfontein.

Enrolment is officially projected to total 1,400 next year, ultimately rising to 20,000 on ten campuses. The new institution will begin teaching in classrooms borrowed from township schools and teacher training colleges. But it plans to begin moving into its own purpose-built campuses by 1985.

Vista's first rector has been appointed, Professor C. F. Crouse, a 47-year-old statistician. Before he was chosen to head the new university, Professor Crouse was vice-rector for planning at the correspondence University of South Africa.

Like most leading Afrikaans educators, he is a member of the Afrikaaner Broederbond, the secret interlocking directorate of the Afrikaans elite.

Professor Crouse said that Vista's initial focus will be determined by the manpower needs of the economy. The stress will be on teacher training in the 1983 intake, who will be offered BA and BA in Education courses, moving on to include natural and management sciences in 1984.

Finding the large number of lecturers required "will be one of our major problems," the rector admits. "We will have to make do as best we can," he said. Besides full-time appointees, he expects to hire part-time lecturers from other universities.

Vista has so far been cold-shouldered by liberal English-speaking academics, with Witwatersrand University officially declining a place on its governing council. Its teaching staff is thus likely to mirror that of the "bush colleges" - mixing relatively conservative Afrikaans with a limited number of blacks.

Asked why it was necessary to create a separate university for Africans rather than expand existing institutions, Professor Crouse declined to reply, saying he did not wish to become involved in political controversy.

But he denied that Vista was set up in terms of a Broederbond plan to limit the number of black students allowed into the white universities.

Principal in car ambush

from A. S. Abraham

BOMBAY Bombay University vice-chancellor, Professor Ram Joshi, was injured when over a dozen students waylaid his car and stoned it in an isolated spot near his home.

Two students were caught by Professor Joshi's driver and bodyguard and two more were arrested later. But the others escaped. All the attackers wore brown paper masks.

The four students were held on criminal charges.

The assailants belonged to a left-wing extremist student body known as the Vidyarthi Pragan Sanghanna (Students' Welfare Association) which makes up for its unimpressive following by violent militancy.

Academic and public reaction to the attack was critical. But the federation of university and college teachers' bodies also criticized the vice-chancellor for earlier summoning the police on campus to deal with protesting teachers.

Changing ways with words

Americans speak English which is more English than that of Britons, according to a professor of speech at Duke University.

Dr Ronald Butters, Professor of English and editor of the journal American Speech, claimed last week that British English has changed more rapidly than American English since the American Revolution and even the First World War.

Citing the television adaptation of Evelyn Waugh's *Brideshead Revisited*, Dr Butters said the text had been altered to reflect changes in British usage since the war.

The most striking example had been that while most Britons have recently begun to say: "I should have done," Americans say, more correctly, "I should have."



American universities provided a big share of the experiments carried aboard the space shuttle which is in its third mission this week. Stanford and Utah universities cooperated on an experiment designed to explore the electrical properties of the Columbia as it flies through the thin ionosphere at the uppermost layer of the Earth's atmosphere. The University of Florida has provided an experiment to study the cloud of particles the spacecraft carries as it leaves the Earth's atmosphere. Columbia University is mounting an experiment on solar flares and the University of Pennsylvania is using the shuttle to discover how weightlessness affects the growth of plants. A Minnesota High School pupil whose experiment on insects in weightless environments will join eight university projects, was present to watch the Columbia take off.

The Times Higher Education Supplement Important news for New Subscribers

New subscribers to The Times Higher Education Supplement can now take advantage of our special introductory rate of £22.50 for a year's issues - even cheaper than buying it from your newsagent. Simply complete the coupon below and our computerised subscription service will process your order at once. *Offer applies to new subscribers in the UK only.

Please send me The Times Higher Education Supplement for one year. I enclose my cheque for £22.50.

Please print NAME

ADDRESS

SIGNATURE

DATE

Mail this coupon with your cheque to Times Newspapers Limited, Subscription Manager, Oakfield House, 35 Perryman Road, Haywards Heath, West Sussex, RH16 3DH.

Peter David, North American Editor, The Times Higher Education Supplement, National Press Building, Woodrow Wilson Way, Washington, DC 20045, Telephone (202) 438 6764

Handwritten Arabic text in the left margin.

David Jobbins sets the scene for next week's NUS conference and predicts a major shift to the left

Whatever the outcome of next week's contest to find a successor to Mr David Aaronovitch, who ends a two-year stint as president of Britain's 1.2 million students in June, the National Union of Students is certain to realign itself for a new, tough era.

Of the seven men - no women are standing for president this year - the two closest contenders would usher in a different style of leadership from that of Aaronovitch. He tried to project NUS as a skilful but low key pressure group treating with politicians of all persuasions like the well-established industrial unions.

The confrontation of the late 1960s and early 1970s was relegated to the dreamland of the extreme left as the Left Alliance, Aaronovitch's broadly-based coalition of liberals, communists, and independent socialists, tackled student issues with an astute blend of behind-the-scenes lobbying and well-publicized criticism of spending cuts and of lost opportunities for educational advance.

Now though, the writing is on the wall for the Aaronovitch approach, and possibly for the Left Alliance. Hard-nosed monetarism has dealt what may turn out to be the death blow to statesmanship and rational negotiations.



Dougle Herd: jokes against himself

Election heralds new mood for NUS

But a return to the barricades is equally unlikely for two reasons. First the consensus that crucial decisions should be taken by cross-campus ballot now embraces all but the extreme left. And secondly the Government as enemy, not the vice chancellors or directors of individual institutions, is firmly in students' sights. The weapons of immediate confrontation - occupations or disruptions of the decision-making processes - are patently useless against Number 10, the Treasury, and their allies in the Department of Education.

Last year, Aaronovitch clung to office by the skin of his teeth. He won by only 16 votes on the fifth ballot in a struggle with the Labour students' candidate, Ms Helen Connor. It was enough to convince observers that the alliance's days were numbered and that the National Organization of Labour Students was at last a force to be reckoned with in student politics.

Next week in Blackpool those predictions will be put to the test. The Left Alliance's candidate, current national secretary, Dougle Herd, is, like Aaronovitch, a member of the Communist Party. But the resemblance stops there.

Herd, who favours a collective alternative to the Oval Office tendencies exhibited by a sometimes bombastic Aaronovitch, is a Scot with the national characteristic of often telling jokes against himself. Naturally self-deprecating, he admits he took some time before deciding to try to step into the shoes of Sue Slipman, Trevor Phillips, and Aaronovitch.

"We must elect a president with the ability to transform our independence, confidence and policies into the truly powerful, democratic and social force we know the student movement can be," he says. "That confidence and ability to look forward and influence our futures will come not from a style of leadership based on a caped crusader, a masked marvel or a superintelligent charismatic superhuman."

He intends to build on the links

with the trade union movement established by Aaronovitch and his fellow Left Alliance executive members - embodied largely in the Jobs for Youth Campaign and the Education Alliance.

Neil Stewart, his major rival, thinks however that the campaigns on which the Left Alliance staked much of its credibility were weakened by lack of local mobilization. In particular he thinks that NUS should step up its work with receptive local authority leaders as a means of demystifying student politics and achieving a wider audience for its educational policies.

Stewart, this year's NUS Scotland chairperson, is an astute politician, active at all levels in the Labour Party and gifted at catching the eye of the media rather than receding in horror at its selective and fickle attentions.

He is keen to make clear that a NOLS presidency would not end the political pluralism the Left Alliance regarded as a necessary ingredient of the NUS leadership.

Indeed only a seasoned watcher of Endsleigh Street in-fighting could safely distinguish the rival policies, rendering the contest more like a United States presidential than anything else. It is largely a difference of emphasis, far more than can be said of the other five candidates.

They range from Aaronovitch's old enemies, the Trotskyite Socialist Workers Party, advocating mass action in common with industrial workers, through to the extreme right anti-NUS candidate who declares he is dedicated to a disaffiliation policy because of the union's lack of democracy.

In between is the hard-line Socialist Students Alliance, an ecology candidate, and moderate Conservative Peter Moore. The 'Tory wets' survival factor has surprised many observers. Although their language is that of tough realism, they have successfully distanced themselves not only from Tory monetarism and its educational implications but from the hot-heads within the Federation of Conservative Students, which again

is not standing candidates itself this year, although it inclines towards the anti-NUS stance.

The major omission from the line-up of presidential candidates is the embryonic Social Democratic Students/Liberal Students alliance. Despite a hiccup or two when some Social Democrats drew the line temporarily at supporting a communist for president, the alliance has now reverted to its initial intention of backing the Left Alliance. The alliance leaders feel that the reasonable, rational note sounded by NOLS cloaks a militant wolf ready to hijack NUS and turn it into a campaigning machine for Tony Benn. "The Left Alliance's outlook and policies towards the future of NUS are, much closer to ours," one alliance leader said.

This year the new alliance is testing the water by standing for just one of the key posts, treasurer, but running four candidates for the 12 part-time places on the executive.

The likely outcome is a shift to the left - a reaction against the patriarchy of the Left Alliance combined with a higher-profile response to the threats posed by a continued erosion of the value of the grant and the run down of higher education.

New forces could upset the balance. The further education colleges are playing a more prominent role than ever and their political stance is uncertain. And while the single transferable voting system should benefit middle-ground parties, many observers believe that students may balk at second-preferencing the SDP/Liberal Alliance.

Despite a late and faltering start, leaders of the student Social Democrats firmly believe that their arrival on the scene, claiming 4,000 members, will break the mould within a year or two.

They see the flux at the centre of the student movement, now probably moving away from the Left Alliance, as an opportunity to create new alignments. One permutation is for the Communist Party to forsake the LA and once more join forces with Labour students, while the Liberals, SDP and wet Tories step in to mop up the middle ground.

This frenetic shuffling for a place on the executive is likely to have one consequence which nearly everyone regrets - the weakening of the independent membership. Ironically this happens when the non-aligned students are steadily increasing their



Neil Stewart catches the media's eye

representation at conference.

The new realism among students could lead to increased volatility with support switching among political factions? Though the NUS pre-conference was a more moderate one for years, there is nevertheless an undercurrent of frustration at the leadership's reliance on activities such as the Jobs for Youth campaign and the Education Alliance. Students passing through college in three years or so still want near-instant results, and the slow grind of the TUC's cumbersome internal machinery has dulled the enthusiasms of even the most ardent of the Left Alliance's supporters.

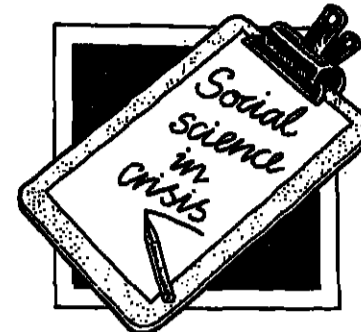
So far moderate student leaders have been able to keep the lid on, largely by substituting tactical safety valves for the extreme left's insistent demand for confrontation.

But even the most moderate was shocked at the Government's reaction to the NUS grants submission when it acknowledged that a grant for a 17.4 per cent increase had been argued then rapidly announced a 1 per cent rise and the pegging of the parental contributions threshold to a move which will give most students less money next year.

It was the death knell for rational discussion - potentially the opening for the collaborationist tactics of the Left Alliance.

Social science in Britain is facing its biggest crisis with university and polytechnic research threatened by cuts. Paul Flather looks at the Rothschild review of the SSRC in the first of a series on the discipline

Taken in evidence



Lord Rothschild is currently sifting through piles of submissions and interview notes collected as evidence for his review of the Social Science Research Council. Most were solicited but more and more have been arriving at his city bank from concerned social scientists who want to put their views on record.

That is how seriously his review is being treated by the academic community. It is the sternest test faced by the SSRC in its 15 years. To date Lord Rothschild has declined all interviews, but he is reportedly putting many hours and preparing a substantial document.

The review, which will be published to allow a full debate, and the way the Government reacts to it, will be a litmus test for the wellbeing of social sciences in Britain. The Government has never hidden its ill-feeling towards social sciences.

Suspicion was high even before Sir Keith Joseph arrived at the Department of Education and Science last autumn. A discriminate cut of 11.1m (5 per cent) in the SSRC's social science research budget, Cabinet letters confirmed that Sir Keith was looking for more than reform. He wanted to know if after certain reforms the SSRC would have a role left.

Since 1979 the SSRC budget has been cut by a quarter, commissions from Government departments have fallen by a third, and student awards have been halved. And the trouble has not been confined to the SSRC. The University Grants Committee letters sent last summer demanded significant cuts in social science teaching and research in 27 universities, again a discriminate attack. Politicians have been cutting for several years and the social sciences have carried a high share of the burden.

According to early surveys social studies departments in 18 universities faced cuts of 17 per cent or more over three years, and five more faced cuts of 30 per cent. Surrey, Aston

Kent, Stirling, are all in the front line.

The social science tidal wave apparent in the 1960s and early 1970s is ebbing away - and the foreseeable future suggests little respite. But the issues raised by the Rothschild inquiry signify a crisis of confidence that goes well beyond the allocation of funds and value for money.

The review has concentrated minds on four major questions: how should social sciences be funded; how should the independence of social science research be guaranteed; how should the best research be discovered and assessed; and how far should social science research be policy-oriented or long-term and fundamental.

These questions had been simmering for some time, and were stirred up first by the controversy over the SSRC's plan for an internal restructuring. It is said the row attracted enough attention to force the Government to call in Rothschild. That may be true. Equally the review has forced social scientists to rally round their research council, putting aside for the present their fears and criticisms of the policy-orientated committees system.

As the sample of views below shows, many people have told Lord Rothschild they fully support a strengthened SSRC, with more funds not less, but also perhaps with a clearer brief. Most also argue that

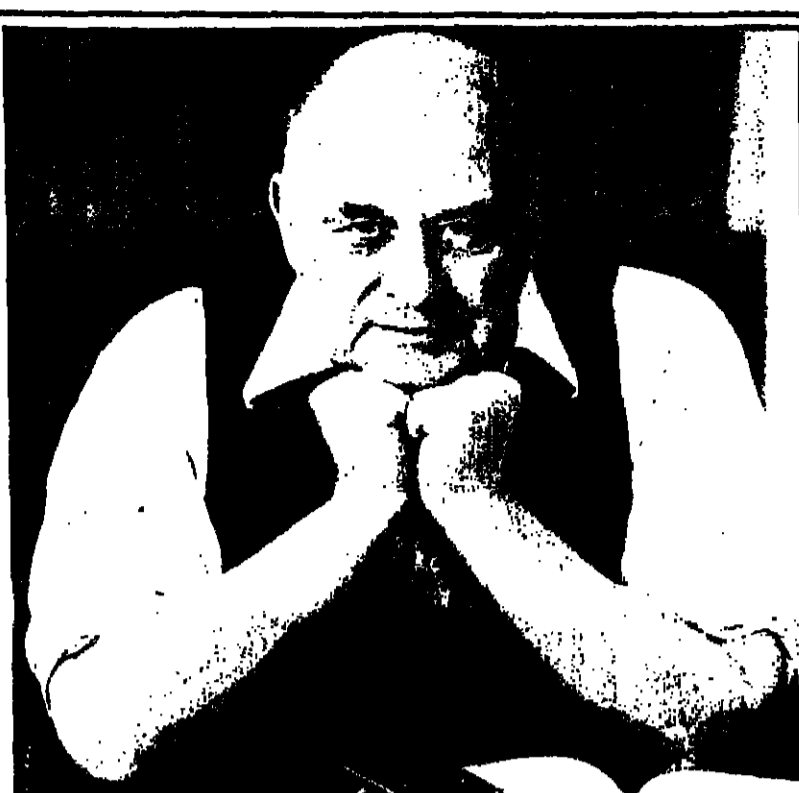
Rothschild's customer-contractor principle is particularly inappropriate in the social science field. At the same time many people agree that all is not right in the SSRC. Areas for review could include the running of business education, postgraduate awards, staffing, and the share of long-term government research controlled by the council.

Lord Rothschild has been asked to complete his review of research published in 1971 as a Green Paper, *A Framework for Government Research and Development*. The SSRC was left out because it was still in its infancy.

Now all Lord Rothschild's attention is focused on the SSRC. His strictures to the research councils in 1971 were that the public was not getting value for money in the form of applied research of immediate relevance to Government departments. Hence the customer-contractor principle: the customer picks, the council does the work if it can, and the customer pays.

He now has to assess the truth of the Heyworth Committee's view, stated when recommending the SSRC be set up, that the extra funding required "would be more than repaid by improvement in the efficiency of the national economy and the quality of national life." The report is expected in May. It is bound to recommend some changes.

These are its terms of reference as stated by Sir Keith Joseph: which areas, if any, of the SSRC's work should be done at the expense of the ultimate customer rather than the exchequer; which areas, rightly supported by the Exchequer, could be done at least as well and as economically by other bodies, who would receive payment from the public purse either on a once-and-for-all or recurrent basis. The bodies concerned should be identified; and which areas, if any, at present supported by the Exchequer through other bodies could better be covered by the SSRC.



Rebel with a cause

Nathaniel Mayer Victor, the third Baron Rothschild, FRS, was always destined to be one of society's Great and Good. Born with the recognizable burden of being very rich, very intelligent, strongly Jewish, and a member of the world's most famous intellectual banking family - it is fair to say he has triumphed over all.

He has been a scientific researcher at Cambridge, a corporal in wartime military intelligence, research coordinator at Shell, head of the Government's Central Policy Review Staff (Think Tank) and he now runs the British end of the Rothschild empire. It was his remarkable questioning and unorthodox approach to issues that persuaded Edward Heath to appoint him (to Labour peers) to head the Think Tank in 1971. He is bringing these same qualities to bear on the SSRC.

Lord Rothschild, now 71, has always been a kind of rebel. After Harrow and Trinity College, Cambridge, he went as expected to work in the family bank. Six months later he was back at

Cambridge lecturing and researching in biophysics. "I asked myself what am I doing here. I am not very interested in finance," he said at the time.

He was a natural games player, playing first class cricket for Northants (once taking 50 off Larwood, the notorious English paceman) and holding a single figure golf handicap. He had a distinguished war record in intelligence and secret bomb disposal work winning the George Medal for "dangerous work in hazardous circumstances" and the American Star for work "while exposed to extreme danger".

In 1960 he left Cambridge to take up a series of industrial appointments, joining the BBC general advisory council, chairing the Agricultural Research Council for 10 years, and also joining Shell, where he became research director.

On the eve of retirement he was summoned to see the then Sir Burke Trend and asked to head the Think Tank, soon dubbed Whitehall's Oxbridge college without undergraduates. Two colleagues from those days figure highly in the current drama - William Waldegrave an early CPUS staffer, is now an education minister, and Michael Posner, a CPUS energy consultant, is now SSRC chairman.

His four years in Whitehall were never smooth and he was often in the public eye. The most famous row came when he was carpentered by Heath for a speech warning that Britain would become the poorest European country by 1985 if it did not stop behaving as if it were still the richest. Unfortunately it was delivered on a day Heath chose to speak optimistically about the future.

He friends describe him variously as notoriously hard to impress, brilliant and lucid, engaging, confident and a perfectionist. Also as sensitive and eccentric. He has been known to receive dinner guests in his dressing gown and pyjamas, and for so powerful a figure he is obsessively early for appointments. "When I go to see him, I can only speak the truth. He has that kind of effect," one colleague said.

At the CPUS he once said one of his tasks was to "sabotage the over-smooth functioning of the machinery of government." His approach is a search for rationality in problems, and his style is very much to discover and list all the pros and cons, and then let the Government decide.

This espousal of "creative tension" probably makes Lord Rothschild the ideal outsider to look into the inner workings of the SSRC. His spirit of independence can only have been enhanced after reading that Sir Keith Joseph, had described him as a "fired and trusted operator" in private letters to his Cabinet colleagues.

Academics are now eagerly awaiting his report. It is ironic that a man running a multi-million pound bank in devising so many efforts to keep the SSRC should best spend £20m a year.

Are museums museum pieces?

Should Britain's university museums sell part of their collections in order to survive? Ngagio Crequer considers their financial position

There is a common talking point among the directors of university museums whether they should sell some of their exhibits in order to stay open.

The proposition is being actively considered by a number of institutions, whose directors are exchanging correspondence.

It would put the outrage caused by Glasgow University's abortive attempt to sell its Whistler paintings, into the shade. Edinburgh University tried with the idea of selling some paintings but decided against because of public reaction.

The plight of the museums is inevitably bound up with the financial plight of the universities and they are being put further down the pecking order. Three possibilities are being canvassed: the sale of exhibits; the imposition of admission charges; or a change in the method of funding.

Museums play a valuable and important role which transcends their university setting. The Ashmolean at Oxford, the Fitzwilliam at Cambridge, Glasgow's Hunterian, Manchester, Birmingham and London, to name a few, all house unique and major collections.

UK, in nearly all subjects, are held by university museums and their full national and international importance may not therefore be fully appreciated.

They perform a university teaching and research role but are usually open to the public as well, and this is helping to bring the university closer to the outside world. To many they are the public face of the university. In some cases, they have also taken over the local museum.

Yet they still depend on the University Grants Committee block grant. How much becomes available depends on the priorities of the institution.

Grants also come from area museums services and a regional fund administered by the Victoria and Albert Museum provides grants, normally up to 50 per cent, for approved purchases.

The plight of the museums was recently highlighted in a Commons debate about the arts and the cuts. Mr and Mrs Rhodes James, Cambridge MP and Conservative Party liaison officer for higher education, drew attention to the Fitzwilliam. It needed to make savings of up to £40,000 a year by 1984 which could only be done by staff reductions, despite conspicuous under-staffing already.

He said: "Unless there is a change in the way in which university museums are financed, by 1984 the prospects are that the Fitzwilliam, which is at present open on only limited occasions because of the shortage of resources, might have to be closed completely to the public. That would be a tragedy in which I am sure that the Government would

not wish to become involved."

Other museums face similar problems. In 1981/2 the financial expenditure for the Manchester Museum was £485,000. Of this the university contributed £298,000 and the Greater Manchester Council £180,000, the rest coming from miscellaneous sources.

Now the museum, like the university, faces a 16 per cent cut over three years. Two keepers (out of 13) who are likely to retire early, will not be replaced, nor will other technical and manual staff who leave. The late night opening on Wednesdays has been abandoned.

Two live seven foot Mississippi alligators, which cost £1,000 a year to keep had to find alternative accommodation. The fund for specimens has had to be cut.

In 1978 the Standing Committee of the University Grants Committee designated Manchester as a designated museum (that is, centre of excellence) to which the Government has taken no action.

Mr Alan Warhurst, the director, is again charging for admission. Apart from the moral argument, he says that once you have accepted pensioners, students, staff and other special groups, there would be no significant contribution left.

The UGC has consistently resisted pressure from those in the big museums and from the Commission to freeze. I think they are probably right at the end of the day otherwise everybody would want to freeze. But it does now call into question whether the Government should try to look at the plight of university museums and see whether some direct support of funds, bypassing the



This 19th-century Deccan statue of Durgā is a recent Ashmolean purchase

UGC, or from the Commission, would be a better system.

"I think at Manchester we would welcome direct Government assistance so that museums were not competing with the primary functions of the university."

At the Hunterian in Glasgow posts are axed (not just frozen) as people leave. The museum lost half of its technical and a quarter of its secretarial staff in the last round of cuts. Staff are no longer paid to attend meetings at which they are giving lectures.

Benevolent postage is now appropriated to departments, rather than centrally, that bill alone is expected to exceed normal running costs. Opening dates have been curtailed and the museum is looking for ways of raising money.

Dr Ian Rolfe, the deputy director, thinks that earmarking is the only solution. "We cannot continue to be milked cows for the rest of the university. We are also looking into charges for admission and may well have to do it."

The Standing Commission (now called the Museums and Galleries Commission) is conducting a survey to discover how badly hit the museums have been by the cuts.

Its 1977 report noted that the system of financing was not working. It would have preferred indicated grants from the UGC, although it feared this would not be forthcoming. It also suggested museum budgets in each university which would help to clarify the position of museums and lead to a more realistic assessment of their needs.

One point of the present survey is to see if anything came of this recommendation and whether there was anyone safeguarding the interests of the museums in the administrative structure.

So far the results are "half way" through the task but it wants to get sooner, rather than later, collect evidence and present it to Government.

Museum directors will be asking their vice chancellors to act through the Committee of Vice Chancellors and Principals and the UGC, to try to change systems of funding, and inevitably the battle will be fought down as questions of redundancy at the university generally loom large.

The problem however has got much worse since 1977 and museums are overcrowded and poorly staffed. Unless they are fully recognised as the national assessors they are taken out of the university financial pool, their cultural contributions cannot be diminished. Will they then only become museum pieces?

A welcome from the social science researchers

The Social Research Association has welcomed the review, believing its outcome will be a strengthened SSRC with a greater understanding of its role to support long-term strategic and evaluative research which the customer-contractor principle is inappropriate. The SRA, representing more than 600 Government, academic, and independent researchers, says the SSRC alone can fund long term work and strategic work particularly when established policies are criticized, and where the customer is "the public interest".

The SRA reminds Lord Rothschild that the SSRC controls just 10 per cent of the national social sciences research budget and 3 per cent of the total science budget. It argues that there are no obvious candidates to take over the SSRC's work: the UGC could not fund research outside universities; the Science and Engineering Research Council and the British Academy would have to recreate an SSRC equivalent and Government agencies would have too narrow, short-term aims.

It says the SSRC could well handle some long-term studies and related vocational training courses such as nursing and social work. It adds the SSRC needs to clarify its position on policy-orientated work and to disseminate results to researchers. It should also hand out grants to support conferences and areas reviews, and should improve its administration described as somewhat bureaucratic and unresponsive.

Social scientists at Bristol University have called for a revitalized and expanded SSRC that will encourage research which is independent, fundamental, part of a coordinated programme, and explicitly in conformity with a well-educated and self-aware society.

Staff from the department of social administration, headed by Professor Peter Townsend, professor of social policy, say certain research by the Medical Research Council and the departments of health, education, and environment, could well be done better by the SSRC. They point out that social scientists are still at an early stage compared to physical and biological sciences 100 years ago - and by any standard investment is small. An expanded SSRC could help coordinate social and

economic policy and, most important and serious, allow public access to information.

The Bristol staff also call for the designation of more specialized research centres with long term programmes, the development of at least two policy institutes, an independent unit to review production of official statistics, expansion of postgraduate studentships, and positive discrimination so that deprived minorities and client groups are represented as ultimate customers.

The Association of University Teachers, representing 34,000 members, has told Lord Rothschild that the SSRC is the only body capable of funding pure or fundamental research, and adds there are obvious and grave limitations in relying solely on the customer-contractor principle.

The AUT says it is essential that the SSRC continues to support traditional areas of scholarship and work with no immediate application. It would be disastrous if all social science funding went through the university recurrent grant because there would be no safeguard to ensure the money ended up supporting social science research, and the research part of an academic's life could easily wither, the AUT says.

A second important role for the SSRC is to support projects in sensitive areas often with political implications. The AUT says the SSRC is able to commission long term research which goes beyond particular interests of customers. It also says the task of training future researchers cannot be left to customers. It expresses alarm at the level of cuts and calls for sufficient funds to allow the SSRC to support postgraduate training at previous levels. It adds that the SSRC should be given control over some more Government research.

Professor Martin Davies, director of social work at East Anglia University, argues that SSRC research proposals and final reports. Professor Pahl, who has sat on SSRC panels and committees and sits on the UGC social studies committee, calls on the SSRC to appoint more "intellectual brokers" to make the links between applied and pure research.

Government departments, and SSRC's role as an independent source of funding research is vital.

Professor A. H. Halsey, professor of social administration at Oxford, supports more funds for research, an enhanced SSRC, but he is also critical of its past performance. He says the SSRC was set up in Lord Keynes's words to look after the interests of our grandchildren - the long term public interest. It was designed to ensure there was a public contractor and training of researchers. He adds that the difficulties of UGC funding are an urgent reason for more rather than less generous funding. He suggests multidisciplinary research, such as in race relations and industrial relations, promoted by the SSRC should perhaps have extra direct Government funding.

Professor Halsey says there are no new areas of research that the SSRC could do better and goes on to say the SSRC could have done better. He blames poor staffing and the appointment of too many relatively undistinguished researchers to sit on the SSRC council.

Dr Alan Veita a statistics lecturer at Oxford Polytechnic, has urged that evaluation of 11m worth of research work done by the Commission for Racial Equality - recommended by a parliamentary subcommittee - should be carried out by the SSRC.

Professor Ray Pahl, professor of sociology at Kent University, has told Lord Rothschild he believes in an independent research council for social sciences, based on peer evaluations of research proposals and final reports. Professor Pahl, who has sat on SSRC panels and committees and sits on the UGC social studies committee, calls on the SSRC to appoint more "intellectual brokers" to make the links between applied and pure research.

Next Week: The SSRC Record



Computer teaching cannot come into the home too soon

The Beeb gets over its boob

This week the BBC's computer literacy drive got into top gear with the third showing of its series. It anticipates these will attract an audience of around 500,000 viewers, albeit night owls, since transmission is at 11.30pm.

The first public showing after transmissions for schools and colleges attracted an audience of 300,000 to 400,000 earlybirds on Sunday mornings.

The series is one small aspect of the project, parts of which have come under fire. The programmes have attracted criticism because they are general in nature, rather than giving practical instruction as anticipated.

The BBC's project covers the widest conceivable range of activities from the sale of the microcomputer, to the enhanced BASIC language to run on it, to the transmissions of software via Prestel and Teletext, to the setting up of a system of training centres and the computer programmes to market the package.

It was with the programmes that the saga surrounding the ambitious project started, directly leading to the BBC Micro. Taping problems and delays in delivery have attracted unfavourable publicity.

In 1980 BBC Further Education decided to follow its "Silicon Factory" series, then about to go on the air, with a more instruction-orientated batch of programmes. The idea was tested out around Government departments and various educational groups such as the National Extension College.

BBC engineering was given the task of drawing up a specification for a microcomputer, which would suit all users. By then it had been decided to involve BBC Publications and BBC Education in Leeds to set up a referral system for schools and colleges.

But it was not until BBC Enterprises jumped on the bandwagon, inspired by the financial advantage they saw in selling a machine to go with the series, that the Micro began to dominate the scheme. A survey showed that at least 20 per cent of those who watched the programmes would also consider buying a micro-computer.

Tenders were then put out and although Sinclair's ZX81 was thought at one time to be a strong contender, it was Acorn which eventually won the contract. It already had in hand the development of the Atom computer, then known as Proton, which needed little modification to meet the BBC's specification.

By then, it was also decided to adopt the National Extension College BASIC course - the language chosen by the BBC for the computer as being the simplest for beginners to learn. This meant that programming and language could be kept out of the programmes. It took a long time to solder a lead and then the cassette machines did not work. After a few hours I succeeded in loading the first of the programmes. This means that the correct voltage setting is established for the cassette recorder in order to proceed with the various programmes.

The keyboard programme demonstrates the use of the system as a teaching aid while enabling familiarization with the various keys. Other programmes include games and drawing but my favourite was a series of poems by Roger McGough.

The BBC's computer literacy programme got off to a bad start but, Patricia Santinelli reports.

colleges having seen the Micro. Only then did the BBC say that the programmes stood on their own.

At that stage there were some 12,000 orders, two thirds of which were for Model B, the superior model. Now 20,000 orders have been received of which 4,000 have been met and those mostly for Model A.

The secrecy which surrounds production and delivery leaves one to think that not all the problems have been solved. Quite a few of the Model A machines have had to be returned, sometimes because of damage in transit, or other times because of overheating and other technical problems.

The BBC and Acorn are both adamant that all is well now. Acorn says that production of Model B is now increasing.

Mr John Radcliffe, executive BBC producer in the further and continuing education department and the originator of the series, said that they were on course until the beginning of December but then bad luck struck.

A fault was discovered on the ULA chip which halted production. "We are now where we planned to be at the beginning of January" said Mr Radcliffe. The backlog on Model

My friend Micro

Inspired by the microelectronics revolution and unanimous praise for the BBC microcomputer, I decided to order the "wonder of the age" some time ago.

Because of delays in production it arrived only a couple of weeks ago. Meanwhile I have been making do with the loan of a model A, the cheaper model, kindly provided by the BBC/Acorn after the launch of the computer literacy drive.

The BBC Micro comes with a Welcome package and user guide. The package consists of a tape cassette containing some 16 programmes and a 23-page booklet of instructions. The guide is brilliantly conceived and covers many of the facilities offered by the system without complex instruction.

The booklet explains how to connect your micro to your television and then deals with the keyboard layout. The next stage is connecting the tape recorder and here I ran into a few snags. The recorder was defective and the wrong lead had been supplied.

It took a long time to solder a lead and then the cassette machines did not work. After a few hours I succeeded in loading the first of the programmes. This means that the correct voltage setting is established for the cassette recorder in order to proceed with the various programmes.

The keyboard programme demonstrates the use of the system as a teaching aid while enabling familiarization with the various keys. Other programmes include games and drawing but my favourite was a series of poems by Roger McGough.

B will take at least until Christmas to clear.

"I don't believe we should have delayed the launch of the project. It was the right time to strike because of very high public interest. Nor do I accept that people have been disillusioned, only that they have been disappointed", Mr Radcliffe said.

This is not quite the picture that emerges from the regional centres, based on the Government's Microelectronics Education Programmes for institutional users.

At Chelmer Institute of Higher Education, the Advanced Computer Based Education Centre in Hatfield and Leeds Polytechnic where three of the MEP regional centres are based you find almost unanimous belief in the Micro as a machine with powerful potential and cheap at the price.

But at all three centres there is disillusionment caused by both late or non delivery, failure of machines and a great deal of uncertainty about their exact role. There is also growing doubt as to whether the BBC should have gone ahead and mass produced before all "bugs" had been eliminated.

The BBC has come up with a futuristic specification and Acorn with a versatile design. It has been brilliantly marketed by the BBC under its name, to the extent that many people have purchased it on "good faith" knowing very little about the product. We can only hope now that the confusion between all parties is speedily resolved.

The great advantage of the Welcome package is that when you learn the programme in BASIC, many ingenious programming methods are demonstrated and can be studied and applied later.

The complete guide will not be available until the end of May and there are many omissions. But it is sufficiently well written to help one get to grips with many of the facilities offered by BASIC and the BBC machine.

The lack of software has encouraged me to re-examine attempts at the National Extension College's 30-hour BASIC Course. Sadly the tapes provided with this are not as useful as I had anticipated, mainly because I prefer to input a programme from the manual and run it rather than wade through the cassette until being able to load a particular programme.

The system of cassette tape storage results in programmes being extremely slow to load. My own machine has now arrived but I am waiting to return it because of some faults which impair programming.

One of the biggest drawbacks for any adult student is getting technical advice. The BBC telephone number in Kettering is constantly engaged, and none of the Acorn dealers appears to be competent or interested. Only Acorn in Cambridge seems willing to help.

Charlotte Barry looks at advantages and disadvantages of corporate status

ILEA and its famous five polys

The rapidly deteriorating relationship between the Inner London Education Authority and the Polytechnic of Central London has thrown into sharp focus the unique status enjoyed by the five polytechnics under its control.

The Inner London core all have corporate status - a privilege they share with the universities, direct grant institutions like the Royal College of Art and even the nationalized industries. This means they are registered companies linked by guarantees, run by an independent court of governors, can handle their own accounts, own property, employ staff directly and retain the income from short courses and consultancy work.

However they are still bound by the authority's detailed financial regulations which many consider to be petty and restrictive, and may have contributed to the £600,000 deficit incurred by PCL last year. The subsequent breakdown of relations between the polytechnic and the authority illustrates how the success of corporate status depends largely on the conditions which accompany it.

Matters in London came to a head two weeks ago when ILEA told PCL it was withholding its 1982-83 block grant until it resolved its financial crisis, and setting up a joint advisory committee to investigate its management and funding.

Earlier a team of outside auditors went in after the authority refused to fund £50,000 interest charges and said the main cause for concern was lack of accountability and control. Campus unions passed motions of no confidence in the rector Dr Colin Adamson, and senior ILEA councillors urged him to resign in the best interests of the polytechnic - a request he has ignored.

The ensuing deadlock between the two sides shows up the inadequacies of the inner London block grant system. Dr Adamson's position is protected by corporate status, as only the court of governors can remove him from office. As a result the authority has been forced into using the block grant regulations as a lever to influence the court's decision-making.

In spite of the problems at PCL, the directors of the inner London polytechnics (with the exception of Dr Adamson who was unavailable for comment) only have piecemeal criticisms of the ILEA block grant system.

London polytechnics have the power of virement, meaning they can switch funding from one heading to another, but they can only commit this sort of spending to the current financial year. This means they can make a one year appointment, but cannot increase the staff complement on a permanent basis as numbers are worked out to the last detail when the block grant application is submitted.

They can also determine the establishment and grades of non-academic staff (except the half dozen most senior posts), but they must stick to the ILEA grading system, which also determines the number of senior lecturers and heads of department.

Dr David McDowd, rector of the Polytechnic of North London, finds the block grant regulations petty in detail. "These petty restrictions are maintained because ultimately the grant-giving body might want to impose minor detail," he explained.

By submitting and discussing a detailed budget that doesn't necessarily correspond with the realities of the situation there's a great danger that this can lead to overspending."

Mr Michael Edwards, provost of the City of London Polytechnic, more stringent tests on how the polytechnics spend their money, perhaps involving quarterly reports on their activities.

"One of the defects of the present block grant system is that you go along with a block grant application which is too mechanistic, based on what you had the previous year, but including no assessment of performance," he said.

Dr John Beishon, director of the Polytechnic of the South Bank, and chairman of the Committee of Directors of London Polytechnics, agrees that success hinges on the terms of the block grant but considers them largely justified.

"In all cases where the ILEA has retained a certain amount of control they are all reasonable from the point of view of the protection of the ratepayer or the public purse. They have to make sure they are not hampered with future commitments beyond their control."

The only drawback he sees in corporate status is the burden placed on the court of governors to balance the books properly. Any deficits incurred by the inner London polytechnics are not written off at the end of the financial year but carried forward to the next. When South Bank resigned it was running into a £500,000 deficit early last year it had to enter detailed negotiations with ILEA to work out a strategy for spreading the losses.

The biggest advantage of having corporate status, Dr Beishon feels, is being the direct employer of the polytechnics staff instead of the local authority. "I wouldn't have taken on this job if I had had to be the employee of a county council."



Dr Ricketts 'gains doubt'

Thames Polytechnic has recently sold a strip of sports ground to make way for the new A2 bypass, and used the additional £114,000 income to build an all-weather athletics surface. But Dr Norbert Singer, the director, feels the overall advantages of corporate status are less tangible.

"I think it gives an institution a feeling of being itself and a sort of self-respect which is difficult to generate in any other way," he said. "It is an atmosphere that is valuable rather than a concrete result."

The inner London polytechnics enjoy corporate status for historical reasons, as all five were founded as independent charitable institutions. Later aided by the former London County Council and then the ILEA.

The remaining 25 polytechnics come directly under control of their managing authorities, their governing bodies are usually dominated by local councillors, but it is generally felt that they are less oppressed by local controls than the ILEA polytechnics.

The Committee of Directors of Polytechnics has long advocated giving corporate status to a nationally co-ordinated system of funding which would bypass the local authorities and be free of petty regulations. Dr Ray Ricketts, chairman of the CDP, said: "If the money is channelled through the local authorities in spite of corporate status it's doubtful if you have gained a great deal."

But at some point the interim National Advisory Body has got to consider whether it wishes to continue with the present form of funding through the local authorities, and if it does it must come to the conclusion that it would have to have corporate status in order to receive those funds."

Polytechnic directors have now shelved an initial campaign to win charter status for the polytechnics. Instead, they feel that achieving corporate status would make them more efficient and responsible to specific local and national agencies without being accused of wishing to "apo" universities.

William Birch discusses why and how the new national body must be reformed

Second thoughts on NAB



under Model B the establishment of a national body to deal with the polytechnics and other major institutions within the non-university sector, together with those such as Cranfield Institute of Technology, and the Royal College of Art which are currently funded directly by the Department of Education and Science. The proposals under Model B envisaged a national body comprising distinguished persons appointed by the Secretary of State and drawn both from higher education and from those fields of employment closely related to higher education. Such a body would have had great credibility within higher education and within industry, commerce and the professions; and it would have provided, for the first time in higher education, an experienced and well-qualified team capable of looking with detachment at both the demand side and the supply side of higher education.

Such a body would have been well-equipped to work closely with the University Grants Committee towards sensible trans-binary planning of higher education. Moreover, it would have provided an opportunity to demonstrate that higher education can be planned and financed with due regard to the needs of the world of affairs but without destroying the basic freedoms which are a necessary part of the ethos and the operation of higher education. By so doing it could have pointed the way towards a rethinking of the planning and management of higher education as a whole, one capable of harmonizing and relating in an appropriate and well-informed way the essential traditions and thrusts in higher education. As a consequence the needs of students and of society would be met more effectively.

Assurance has been given by Government that the consultative exercise based on the Green Paper will give rise to serious policy considerations relating to longer-term arrangements for the financing and management of higher education in the non-university sector. However, it has been argued for reasons which are by no means clear, that legislation to provide for machinery of the kind envisaged in Model B would not be possible within the life of the present Government. It has further been argued, and in this case understandably, that the immediate problems facing the non-university sector of higher education need to be dealt with by an interim arrangement designed to bring about a National Higher Education Council of its own kind.

Two steps, therefore, appear to be necessary. First, an evident concern to return urgently to the substance of the Green Paper and to devise and legislate for appropriate longer term arrangements for higher education in the non-university sector. Such arrangements would need to recognize that there exists in the polytechnics and other major institutions an important force for the development of higher education towards a more effective relationship towards the working of the country - one capable of doing appropriate justice also to those aspects of learning

which relate to the enlargement of the general qualities of the student's mind. Providing for such institutions to excel further in their work by creating an appropriate framework of management and funding could be shown to be in the interests of the country as a whole and of its major regions and, therefore, a consideration over-riding political difficulties as between central and local government. The essential purpose would be to ensure that students and those who prospectively are their employers would be better served by the higher education system.

The second step must clearly be to look again and quickly at the interim arrangements which have been devised for the local authority system of higher education now assembled under the National Advisory Body. Two changes are suggested:

1. The Committee for Local Authority Higher Education comprises members of CLEA, albeit chaired by the parliamentary under-secretary of State supported by officials of the Department of Education and Science. It has the major task of determining the appropriate scale of activity of higher education within the local authority system and negotiating with government the appropriate share of the total national expenditure on higher education, that is the division of expenditure between the university and non-university sectors, (excluding the direct-grant colleges). In so doing the committee will have to digest and evaluate the recommendations of the Board for Local Authority Higher Education and would evidently benefit greatly from the presence and the advice of additional members of standing in higher education and in relevant fields of employment. The inclusion of such members would do much to dispel the sense which has emerged that the essential purpose of the committee and the National Advisory Body as a whole is to contract the level of activity and investment in the local authority system of higher education. So constituted, the committee would be equipped to think through and give appropriate scope to those activities in full-time and part-time education which institutions such as polytechnics have demonstrated to be a major need in the higher education system. In this connection it is significant to note that a number of the major polytechnics provide, in addition to part-time and short course training and retraining courses for students from public and private firms in their regions; full-time and sandwich courses for year, including first degree and postgraduate students whose numbers exceed those in several of the universities.

2. The Board for Local Authority Higher Education and would evidently benefit greatly from the presence and the advice of additional members of standing in higher education and in relevant fields of employment. The inclusion of such members would do much to dispel the sense which has emerged that the essential purpose of the committee and the National Advisory Body as a whole is to contract the level of activity and investment in the local authority system of higher education. So constituted, the committee would be equipped to think through and give appropriate scope to those activities in full-time and part-time education which institutions such as polytechnics have demonstrated to be a major need in the higher education system. In this connection it is significant to note that a number of the major polytechnics provide, in addition to part-time and short course training and retraining courses for students from public and private firms in their regions; full-time and sandwich courses for year, including first degree and postgraduate students whose numbers exceed those in several of the universities.

The author is Director of Bristol Polytechnic and was formerly professor in the University of Leeds and the University of Toronto.

Higher Education which had been expected to emerge as "the power house" of NAB is, in practice, heavily constrained by its terms of reference and by its evident degree of dependence on instructions from the superior committee. Moreover, its membership is representative of interested parties rather than being drawn from people appointed in their own right. In addition the membership of the board is heavily weighted towards officials from CLEA and the DES. Such an arrangement cannot be expected to provide a body capable of working closely and effectively with the UGC and so engaging in effective transbinary academic planning. It would, however, even at this stage, be possible for both national and local government to take note of, and act upon, the clear and unambiguous advice from higher education and industry and to co-opt to the board experienced people from higher education and from relevant fields of employment who might enable the board to become a power house. Were it to be felt that by co-opting perhaps eight or 10 such members, appointed by the Secretary of State, that the size of the board would be too great, it would not be unreasonable for the CLEA and DES components of the board to be reduced, given their present dominance of the NAB's superior committee.

There is no doubt that higher education in Britain needs to demonstrate for its own sake and for the sake of the country its concern and its ability to achieve a more appropriate balance between the needs of scholarship on the one hand and the needs of society on the other. In dealing, therefore, with those institutions such as polytechnics, which have been established explicitly to achieve a close relationship in their teaching and in their research with industry, commerce, the professions and the community, policies which give greater weight to political rather than educational considerations cannot be considered. Those who do not have any great hope of success. Without remedial action a number of opportunities will be missed:

1. To inform more adequately the planning and the funding of higher education through direct involvement in the committee and the Board for Local Authority Higher Education of persons appointed in their own right from higher education and the fields of employment which it serves.

2. To provide thereby confidence to those working within the non-university sector of higher education that rationalization will be dealt with in a manner which is in fact rational and well informed and which will, therefore, recognize established success and seek to develop and support it within the constraints of finance.

3. To influence the perceptions of purpose and value in higher education within the school system in such a way as to encourage and to assist more young people to enter higher education with the intention of preparing themselves to contribute directly to the working life of the country.

4. To recognize that students in higher education, whether in the university or the non-university sector, merit careful and balanced consideration of their needs and aspirations and to move, therefore, with dispatch to a system of planning and funding which is not distorted by value judgments between more pure academic pursuits on the one hand and more professionally-oriented pursuits on the other; a system which does rather recognize, with Karl Popper, that "there are no subject matters but only problems" and therefore establishes firmly the notion that the over-riding purpose and responsibility of higher education is to train people in those intellectual and practical skills which relate to recognizing and solving significant problems.

The author is Director of Bristol Polytechnic and was formerly professor in the University of Leeds and the University of Toronto.

The Board for Local Authority Higher Education and would evidently benefit greatly from the presence and the advice of additional members of standing in higher education and in relevant fields of employment. The inclusion of such members would do much to dispel the sense which has emerged that the essential purpose of the committee and the National Advisory Body as a whole is to contract the level of activity and investment in the local authority system of higher education. So constituted, the committee would be equipped to think through and give appropriate scope to those activities in full-time and part-time education which institutions such as polytechnics have demonstrated to be a major need in the higher education system. In this connection it is significant to note that a number of the major polytechnics provide, in addition to part-time and short course training and retraining courses for students from public and private firms in their regions; full-time and sandwich courses for year, including first degree and postgraduate students whose numbers exceed those in several of the universities.

The author is Director of Bristol Polytechnic and was formerly professor in the University of Leeds and the University of Toronto.

The author is Director of Bristol Polytechnic and was formerly professor in the University of Leeds and the University of Toronto.

The author is Director of Bristol Polytechnic and was formerly professor in the University of Leeds and the University of Toronto.

The author is Director of Bristol Polytechnic and was formerly professor in the University of Leeds and the University of Toronto.

The author is Director of Bristol Polytechnic and was formerly professor in the University of Leeds and the University of Toronto.

The author is Director of Bristol Polytechnic and was formerly professor in the University of Leeds and the University of Toronto.

The author is Director of Bristol Polytechnic and was formerly professor in the University of Leeds and the University of Toronto.

The author is Director of Bristol Polytechnic and was formerly professor in the University of Leeds and the University of Toronto.

Many Western experts on the Soviet Union, including the official advisors of several recent United States administrations, consider that the growth of Soviet capabilities is related primarily to political and military factors. On the other hand the rise of the US is usually explained by its ability to utilize scientific and technological development.

American power has been created through wealth, technological innovation and a high standard of education. This perception of the differences in the overall technological capabilities of the two superpowers has some historical justification, but it is not valid for the situation in 1980-82.

Although there are still differences in Soviet and American scientific and technological capabilities, the wide gap which existed in the years 1930-50 has narrowed during the last two decades. It is a priority of the Soviet administration to remove this gap completely in all branches of industry, research and development and education at all levels.

However, even now Soviet science and technology presents a heterogeneous picture. Obvious advances in some important fields coexist with backwardness in other equally important research areas. This mixed level of research and development is clearly related to strong political interference in and manipulation of scientific research.

The method of interference has changed with time. The "Stalinist" politicization of science - the notion of special "proletarian, socialist science" and "the class struggle in science" - has been gradually replaced by the politicization of scientists and the creation of a party science elite.

The official ideology expresses itself less in the substance of scientific research and more in the system of qualification and promotion for high level academic positions.

Party and state interests are well represented among senior scientists, including in the most prestigious body - the Academy of Sciences of the USSR. In 1927 there were no Communist Party members among the academicians. By the 1940s party members formed a small but influential minority. In 1981 over 60 per cent of the full members of the academy (which is now much larger) and more than 70 per cent of the corresponding members (the younger scientists) belong to the CPSU. Moreover most joined the party before their election to the academy, not after.

This political influence is even more evident in the administrative structure of science and higher education. It has a negative effect on science, although it is not as serious as the direct substantive interference in research typical in earlier periods. Refusing to promote or to award higher academic degrees to talented, but apolitical or dissident scientists, or dismissing them when their dissent is too public, clearly hinders scientific progress. It also discourages dissent, which has decreased significantly since the late 1960s.

There are always enough politically loyal scientists to fill important positions, but loyalty and brilliance often do not go together. As a result directors of research institutes often prefer to be administrators, rather than to provide scientific leadership. The current problems of Soviet science and technology are best understood in the light of the achievements of early Soviet science and its later failures and troubles.

The Soviet Union inherited a comparatively small, but scientific tradition from the tsars. In 1913 there were about 11,000 professors and research scientists. The quality of research was high and the international reputation of Russian science was good. Industrially oriented branches of research were also being developed. Most of the research establishments were situated in Moscow and St Petersburg. Professors and scientists belonged to the highly paid middle class group, and a professor earned 15-20 times more than an industrial worker. Eighty per cent of the Russian population was illiterate and even primary education was available only to the minority. Most scientists had liberal political views, though a few belonged to the more "radical" Constitutional Democratic Party.

During the Civil War (1918-1921) most of the scientific elite was



The old and the new: conformist Lyenko (left) and dissenting Sakharov.

Soviet political control of science has shifted away from directives on how to do research to the selection of who can do it, argues Zhores Medvedev

From Lyenko to Sakharov

against the Bolsheviks and many prominent scientists and university teachers emigrated to the West. Meanwhile the Soviet leadership introduced a programme to develop all forms of education and research. The reconstruction of industry was to be based on the most modern achievements of science and technology.

Dozens of research institutes which still exist today were founded in 1918-20. In spite of the Civil War there were more university students in 1921 than in 1913. At that time the policy towards "bourgeois experts" was very tolerant. The government did not interfere politically into the substance of their research. Their educational and scientific potential was to be used. Scientists of the older generation, who were still called "bourgeois experts", occupied most research and academic positions, as well as scientific advisory posts in government offices in the 1920s.

The major industrial projects of the first Five Year Plan were heavily dependent upon their contribution. In general Soviet science made remarkable progress in the 1920s and there were many important discoveries in biology, genetics, physics, chemistry, geology and other fields.

This period of tolerance and comparative freedom came to an abrupt end in 1929-30. In the general atmosphere of "extraordinary measures" against the peasants, food shortages and new international tensions, Stalin began to use methods of terror against the "bourgeois experts". They were accused of sabotage and "wrecking". Several show trials, like the Shafitsky case, the Industrial Party case (neither the Industrial Party nor the Peasant Party, actually existed) started a wave of persecution of "bourgeois experts". Dozens of well-known scientists and engineers were arrested, imprisoned and often executed. This repression was rationalized by ideological slogans and denigrating statements on the specific nature of "proletarian science", the necessity to have "red professors". There was a general purge of almost all scientific and educational establishments.

In spite of these repressions, universities, technical schools and re-

search institutes continued to grow rapidly. But the substance of research, the methods, priorities and problems changed. Many important fields of research, like genetics, cybernetics, quantum-resonance theories in chemistry and even Einstein's theory of relativity, were under attack as anti-Marxist and anti-materialist. "Pseudoscientists" became very influential in many fields of science.

The Lyenko affair is well known in the West. What is less well known is the disruptive influence which it had in many other practical fields. Lyenko's pseudoscientific ideas dominated Soviet biology from 1937-64. It was the only form of biology taught in all schools, universities and agricultural colleges. Even medical schools were affected and medical or human genetics was not taught in the USSR from 1938-65.

The research institute of medical genetics was shut down in 1937 and only reopened in 1970. Theoretical aspects of human genetics (inheritance of psychological or behavioural characteristics) were not recognized officially until 1981. At a special general meeting of the Academy of Sciences of the USSR in that year, it was agreed after heated debate that a genetic approach could be used to study human psychology and special talents like musical, poetic, literary etc. Lyenko's influence was especially harmful in agriculture, where the application of modern methods of selection and hybridization were delayed for at least two decades.

In other theoretical fields like physics, cytology, organic chemistry, and soil science similar pseudoscientific ideas dominated at various times. Research work in cybernetics, considered reactionary and "ideological" until ten years after the war. This caused a ten-year delay in computer design, which is responsible for the backwardness of Soviet computer technology.

During these "dark ages" of Soviet science some areas of research were tolerated, isolated from political interference. Soviet nuclear research, for example, developed the means to "have red power" for energy and Soviet nuclear power station opened in 1954.

After Stalin's death Soviet science became less isolated from the outside world. The import of Western technology and the opening of the West to Soviet scientists and engineers made it clear how backward the Soviet Union really was in most non-secret fields of science and technology. The situation was much better in highly classified, military-oriented fields, where free scientific co-operation has never been possible and where the Soviet intelligence services have probably kept the government better informed about European and American developments. The first Soviet space satellite, based on military missile technology, was not very sophisticated, but it was the first.

Khrushchev, however, expected that science and technology could quickly reach the international level by copying the most advanced designs and machinery. "Creative assimilation" of Western achievements became the slogan of the day. The class struggle approach was forgotten in almost all practical fields, although pseudoscientists like Lyenko and a few others survived in some theoretical sciences. The role of DNA as the source of hereditary information was still not acknowledged in official textbooks of genetics and biochemistry. Many journals refused to publish papers and academic councils to award higher degrees to authors whose analyses were based upon classical genetics.

The copying trend in science continued for 12-15 years. It was a relief after the isolation of the Stalin era. Scientists and science administrators positively reacted to this qualitative gap between Soviet and Western science. Many progressive trends were stimulated: there was a rapid change in educational attitudes, especially towards the knowledge of foreign languages; the quick publication of journals of abstracts of the world literature in many fields; foreign books and papers were translated and international co-operation was encouraged in science and technology. However, free co-operation was never permitted, nor was free travel abroad to scientific conferences and congresses.

Khrushchev's strategy was simple. He believed that copying modern achievements and establishing new

large multidisciplinary research centres would give immediate results. He also thought that some of the newly established universities would begin to produce talented scientists from specially selected gifted young people in the same way that specialized music and dancing schools supported by the Soviet ballet, orchestra, opera and theatre with gifted and well-trained performers.

The Novosibirsk academic town is the best example of his plan - more than 40 new research institutes were established there in 1957-1961. Other smaller scientific towns were opened in Pushchino (seven institutes, mostly biological), Dubna (an international physics centre), Obninsk (eight institutes, mostly for radiochemical, nuclear energy and radiology research), Balkanur (space research) and others.

The research establishment became the largest in the world. But in spite of generous grants, copying Western science could not give science a desirable lead. There was improvement, but no real progress. Western development had been halted for some reason, plans could perhaps have attained the lead, but this was the time of the scientific and technological revolution. No sooner had experts mastered and produced a piece of technology or equipment than it was already obsolete.

The Soviet Union was not a member of any international convention on patents or licences or copyright. It could copy anything and produce it without permission. Producing licenses were expensive and to buy the necessary equipment or machinery would cost even more in hard currency terms. Buying a sample, testing it and making copies seemed simpler. But the time lag meant that the Soviet-Western gap did not close. Nevertheless, the technique of research and development was useful for a time. At least scientists and technologists could study the latest Western scientific achievements. But it was clear that simple copying was not enough. A hypertrophic growth of research and development institutions was produced without many really new solutions.

After Khrushchev fell from power in 1964 the discussion of economic reforms and the possible introduction of market forces into industrial production made it essential to face the problem of the quality of Soviet exports. It was considered unacceptable that the Soviet Union with its developed socialist industry could only offer arms and raw materials for export. Military machinery, or even cars, could not be exported, not only because they did not meet modern standards, but also because they had been copied or partially copied without permission. At the same time it was clear that prestige would be enhanced in the Third World if the Soviet Union could export industrial equipment, machinery and consumer goods.

The reassessment of scientific and technological potential made it clear that reproduction of the latest technological achievements had many limitations. The previous attempts to make the Soviet Union completely self-reliant in every field had to be abandoned. Real cooperation was required. The first step taken was to join the international conventions on patents and trademarks in 1966. The second step was to reduce the percentage of samples for "creative assimilation", and to buy whole industrial complexes instead. Attempts were also made to develop some genuine Soviet designs and inventions to fill gaps in the international market.

The motor industry is the car industry. In 1962 the car industry produced only 166,000 motor cars. In 1965 the number had risen to 200,000. Only was suitable for external sale. There was no good market for private use. The mass production of private cars required the building of a new car industry. It was estimated that it would be easier and cheaper to buy a whole car production industrial complex than to copy European models. A Fiat car plant was purchased, together with a complete set of servicing components. The new Fiat 124 model was imported, the Lada for export, but it was the ordinary Fiat design

The annual production of cars had increased to 1,201,000 by 1975. This is a modest level by European or American standards, but it was a 600 per cent increase, a significant achievement for the Soviet car industry.

At the same time the Soviet Union started to fill gaps in the world market with items such as small tractors, high quality cameras and watches etc. which were cheaper than comparable Western models. In general the Soviet Union is more successful with the export of less sophisticated equipment - the simplicity and cheapness of Soviet models give them an advantage over the more complex Western or Japanese models. Some Soviet-designed tractors produced in Czechoslovakia and other Eastern European countries are finding an expanding market in the US and Australia. A modern tank like the T-72 costs only a quarter of the comparable American tank. The operational and service costs of equipment and machinery are also much lower than comparable Western models.

In the area of high technology the Soviet Union produces linear accelerators, nuclear power stations and aeroplanes for export. However most electronic and computer equipment is now either imported or made in the USSR under license. The USSR has also imported the French system of colour television, Japanese electron microscopes and computers, German dental and medical equipment, European telephone exchange systems, French pharmaceutical materials etc. The new trend of international technical cooperation is restricted, of course, to civilian projects. In strategically important fields the USSR retains full independence from foreign technology.

This gradual and incomplete integration of the Soviet Union into the main international trends of scientific and technical progress has an important influence upon the position of science and technology. First, the division of science into social and bourgeois has disappeared almost completely from the natural sciences and technology, though it is still prevalent in the social sciences. Secondly, scientists and engineers have lost their monopoly of determining industrial progress. To a large extent this progress now depends upon trade, not upon domestic research and design capabilities.

Thirdly, the Soviet Union has become more dependent upon co-operation with the West. However, this dependence is not yet crucial. Even if there were a total embargo on all technological trade with the West, the economy would suffer serious inconvenience, but it would not collapse.

Unfortunately the new era of active scientific cooperation has not made the scientific community freer from rather strict forms of political control. The scientific community in the USSR has become much more exposed to Western influence. This has resulted in a much more vigorous control of the ideological and political maturity of scientists. The party no longer interferes with advice on how to solve a particular scientific problem and it does not try to decide which methods of scientific research are materialistic and which are not. But the party and state apparatus is more than ever involved in deciding who should take part in particular scientific and research missions.

One of the best known principles of the new post-Mao Chinese attitude towards scientists and experts was expressed in Vice-Premier Deng Xiaoping's statement: "It is not important whether a cat is white or black as long as it can catch mice." This was the rule followed in the 1920s, during the first stage of modernization, and in the late 1950s during the Khrushchev's attempts to advance all branches of science and technology in the USSR. It was then that the network of scientific and higher educational institutions grew most rapidly.

The new research centres created outside the big cities (during Khrushchev's time many existing institutes were deliberately transferred from the capitals to provincial regions) offered quick promotion and new opportunities for young scientists. In 1957-63 when at least 15 new research centres were built in parts of the country, research facilities were appearing more quickly

than graduates to staff them. From 1953-64 the number of scientists with the highest academic degrees (academicians, corresponding members of the academies and professors) increased by 30 per cent from 9,200 to 12,100. The number of research scientists, with and without PhD degrees, grew by 300 per cent from 200,000 to 600,000.

By 1976 the growth in the two groups had equalized - both had doubled. During the last five years the rate of growth has decreased sharply to about 3-4 per cent per annum.

Most of these new young scientists went to work in the provincial centres. While ideological conservatism was still strong in Moscow, in the new provincial research centres political dissent was widespread and tolerated. In biology, for example, the Lyenko influence still dominated in Moscow, Leningrad and Kiev, but it was absent from the new provincial institutes in Obninsk, Pushchino, Novosibirsk, Irkutsk or Sverdlovsk, where a strong anti-Lyenko movement developed. Active political discussion was common in the new scientific centres. Progressive trends in the arts and even in political science were supported. Dissident writers, controversial political lecturers and modern painters toured the new centres and were cordially welcomed everywhere.

This regional liberalism did not come to an immediate end when Khrushchev fell in 1964. When the new political leadership clearly developed conservative pro-Stalinist tendencies in 1966-67, the first to protest were scientists and the most open protests were voiced in the new scientific centres. The years 1966-68 were years of protest letters and political statements (against the rehabilitation of Stalin, against the Sinavsky-Daniel trial and the Ginzburg trial, against censorship etc.).

These statements and letters were sent to the Communist Party Central Committee and sometimes they were published abroad. Some of them were signed by hundreds or thousands of scientists. The Soviet intervention in Czechoslovakia in August 1968 marked the end of tolerance towards the liberalism of the Soviet scientific community. Thousands of those who had openly protested were reprimanded, de-

'The Soviet intervention in Czechoslovakia in August 1968 marked the end of tolerance towards the liberalism of the scientific community.'

noted, expelled from the party or dismissed, particularly if they refused to "repent". Those who continued to protest were arrested.

It took several years to remove vocal political dissent from the scientific community. The measures did not only include legal or administrative repression. Structural changes introduced political screening at every stage of scientific graduation, award and academic promotion.

Party bureaux and committees now have far more power in the running of institutes and universities. They confirm appointments at all levels or make recommendations to academic councils if the positions are subject to election from several candidates. Academic councils have advisory functions only and their elections or ballot decisions are not important. Until 1965 only the highest degrees or positions were subject to party approval. Junior scientists were appointed by academic councils. The award of a Candidate of Science (the equivalent of a PhD) was made by academic councils by secret ballot.

Their decisions were final and automatically confirmed by the Highest Qualification Commission at the Ministry of Higher Education. In 1969 the Highest Qualification Commission became an independent institution, rather like a separate Ministry for Higher Academic Degrees and Titles. It has revealed that not only all the top academic degrees (professors, senior research scientists, doctors of science) but other scientific degrees and titles like candidate of science, junior re-



The Novosibirsk academic town in Siberia was established in the 1950s to train gifted young scientists.

search scientist as well. The re-evaluation process is usually secret and political factors are considered. Local representatives of research or educational establishments do not have access to the secret personal files on prospective scientists, which are kept in the KGB or the Party Central Control Commission. The officials of the Highest Commission can consult these files.

Final appointment to all senior research positions like heads of laboratories, departments, chairs, is made up the presidiums of different academies or the scientific departments of various ministries, but the appointment is subject to confirmation by the local district or regional party committee or the Central Party Committee of the National Soviet Republic. The same procedure is followed for election of members of the academies the most prestigious scientific positions in the USSR. Nominees for all important prizes (Lenin prizes, annual state prizes) are also subjected to intensive preliminary political screening.

In 1971 new rules were introduced which gave the Highest Qualification Commission the new right to deprive scientists and teachers of degrees and titles which had previously been awarded in cases of "anti-party and anti-Marxist behaviour". Prior to this, state institutions could strip somebody of an academic degree if it were proven that it had been awarded for research which had been falsified, written by a "ghost" author or plagiarized. New political factors were introduced. Decisions to rescind academic degrees are published in the Bulletin of the Ministry of Higher Education.

The practice is most often used against scientists who have applied to emigrate. In 1976 the rules of awarding academic degrees and titles became even more restrictive. A new government decree stipulated that degrees can be awarded only in cases "where high scientific standards are combined with a good mastery of Marxist-Leninist theory, a broad cultural level, active participation in political life, and following the principles of communist morality in all actions."

The most comprehensive review of political loyalty is, however, reserved for those who apply to make scientific trips abroad. In the USSR only diplomats have passports valid for foreign travel. Scientists receive travel passports just before their journey and they are valid for one trip only. Obtaining permission for a foreign trip takes several months and it involves the approval of the institute, the academy, local and central party and government officials, the KGB and specialized departments of the Ministry of Foreign Affairs.

Western organizers of conferences and symposia frequently complain of the difficulties of inviting Soviet scientists to participate. They can never be sure that Soviet scholars who have accepted invitations will arrive, because their travel expenses are paid by the organizers. The acceptance of invitations by institutions or individuals rather than individuals still does not guarantee the arrival of Soviet participants. Travel restrictions are unpredictable and often seem random. The Fourteenth European Biochemical Conference in Edinburgh in March was attended by about 60 Soviet biochemists although only one of them was delivering a paper. On the other hand, at the

Twelfth International Gerontological Congress in Hamburg in July 1981 more than 15 Soviet scientists were listed in the programme, some for plenary sessions. Not one of them was permitted to attend, and the entire Soviet presence consisted of a single bureaucrat who tried to avoid questions about his colleagues.

The difficulties of travelling abroad are the same for Soviet scientists today as they were 10 or 20 years ago. Moreover learned societies and academies do not try to compensate by hosting international congresses in the USSR. Moscow is the venue for the second least number of international scientific meetings per year in Europe. Only Tirana in Albania hosts fewer.

The omnipotent censorship of publications, including all scientific journals, has often been discussed. Some foreign scientific journals to which scientific libraries or individuals subscribe are confiscated by the postal censors before they reach their destination. Specialized journals like *Cancer Research* usually pass through easily, but journals which discuss events in the international scientific community like *Nature*, *Science*, *New Scientist*, *Scientific America*, *Lancet* often disappear en route. Last year I asked a friend in Moscow to read an article in *Nature*, which is normally open access in the Lenin Library periodicals section. My friend wrote and said that there are more issues missing both from the shelves and from the catalogue, than present.

Any mention in *Nature* or *Science* of Soviet or East European scientific life is sufficient for the issue to be confiscated or buried in the so-called special holdings. No consideration is given to the scientific value of the rest of the journal, which may contain important scientific reports and reviews. These petty obstacles seem irrational, harmful or stupid, but they persist.

It would be wrong to assume that nothing has improved in the last 10-15 years, but the changes are very slow. Soviet research is more frequently published in international journals (usually in English) in 1981 than in 1971, and the quality is often quite high. While freedom of travel had not been introduced, the possibility of emigrating, unthinkable before 1971, exists, though primarily for Jews and dissidents. The flow of emigration reflects the international situation: it is higher when there is less international tension. More than 30,000 people emigrated in 1979, the year SALT II talks were completed. In 1981, the beginning of Reagan's anti-Soviet cold war stand, less than 10,000 people were permitted to leave.

In the West Soviet censorship is often blamed for the absence of many vital statistical records of important aspects of Soviet industrial performance, health and environmental troubles and social attitudes. In many cases statistical data are simply not collected, even for internal analysis. Local officials and specialized services or ministries often conceal information from the central authorities if it could lead to troublesome inquiries. The Soviet Union does not provide the World Health Organization with a comprehensive picture of mortality (causes of death), or infant mortality. The data on this subject which has recently been widely discussed in the Western press has been assembled from complex indirect calculations.

In spite of this long list of grievances and restrictions Soviet science can no longer be ignored as something weak and insignificant. With 1.4 million research scientists, about 6,000 research institutes and 850 universities and specialized institutes of higher education, Soviet science clearly represents a major force which provides the necessary basis for the scientific and technological progress of the country.

A recent television film about Soviet science (summarized in *The Listener* on November 5 1981 as "The USSR has the least practical science in the world"), gave a rather distorted picture based upon the special case of Novosibirsk Academic town. While it is true that there is strict political control, it is not the case that the productivity of scientists and research institutes in the USSR is usually evaluated entirely by the number of publications. The number of industrial rationalizations and improvements, inventions and patents is considered important. Applied science is emphasized even in the research institutes of the Academy of Sciences of the USSR, which are mainly theoretical and are devoted to pure science.

Moreover many institutes are directly related to industry or are subsidized and controlled by industrial ministries. Government statistics pay great attention to the number of technical innovations and their economic effects (in 1980 alone they save 7bn roubles or about £5 billion). The design of new types of machinery and equipment (36,527 for 1971-80) and the modernization and automation of industrial production lines are recorded. Most research positions are tenured, although period five-year reviews are held to stimulate productivity.

Soviet science is still behind American or European science in quality and productivity or research in many, but by no means all, fields, but the gap is diminishing. The large financial cuts to research and development programmes and in higher education budgets in the US, Britain and other Western countries has curtailed scientific progress in 1979-81. In 1982 the situation is very bleak in Britain and even more so in the US. American scientists now have severe financial difficulties in obtaining grants for foreign travel, and this affects their co-operation programmes. Science depends on the basis of co-operation and competition not between countries, but between individuals. Many scientists have life-long programmes for future research and accomplishments. Soviet scientists are usually very bitter about missed opportunities in the past and they are disappointed about current restrictions. But the younger Soviet scientists hope that their ideas will be fulfilled in the future.

Western scientists are usually very proud of their past achievements. Like Soviet scientists, they too are disappointed about current difficulties and financial restrictions. But younger scientists in the West, unlike their Soviet counterparts, often are quite uncertain about their future. Insecurity and economic restrictions can detract from scientific progress as much as political interference does.

The author works at the National Institute for Medical Research in London.

BOOKS

'Why worry about the poor?'

by Tessa Blackstone

The Politics of Poverty
by David Donnison
Martin Robertson, £9.95 and £3.50
ISBN 0 85520 480 X and 481 8
The Politics of Poverty
by Susanne MacGregor
Longman, £2.95
ISBN 0 582 29524 6

In 1977 the EEC published a study entitled *The Perception of Poverty in Europe*. It provided some fascinating findings based on survey evidence about how people in different European countries perceive poverty. Only 8 per cent of those questioned in the UK often saw people in poverty; 24 per cent thought there were poor people but never saw them; and 64 per cent thought such people did not exist. When asked about the causes of poverty the most common ones cited were laziness (45 per cent), chronic unemployment (43 per cent) and drink (40 per cent). In contrast in the rest of the European Community the most frequently mentioned causes were a deprived childhood, lack of education and sickness or ill-health. Laziness was referred to by a substantially smaller proportion (28 per cent) than in Britain. In general British respondents blamed the victim whereas in Italy and France respondents were much more likely to blame society. Moreover in the UK one fifth thought that too much is done by the authorities to combat poverty compared with only 7 per cent in the rest of Europe; just over a third in the UK thought not enough is done compared with more than half in the rest of the European Community.

These startling and depressing figures are reported by Susanne MacGregor in *The Politics of Poverty*. Why the British should be less aware of the existence of poverty, more hostile to the poor in the explanation for it that they put forward and more cynical and unconcerned about finding solutions for it than their European neighbours is unclear. Did the fact that we were earlier off the mark in developing the welfare state than a number of our European neighbours tell us into a false sense of security and well-being, just as our earlier industrialization seems to have contributed to complacency about productivity, output and competitiveness in manufacturing? Or are the British more segregated from their poorer fellow human beings? Is it that they are less well informed about the extent of poverty, and thus less concerned about its existence, because the educational system teaches them nothing about it and the mass media either covers it up or blames the poor for being feckless and inadequate? The answers are not clear. Perhaps the British have more of a sense of history. As David Donnison says in his book, also called *The Politics of Poverty*, "Poverty of the sort the Tudors witnessed has disappeared. No one starves. Very rarely does anyone freeze to death. Supplementary benefit today is worth about twice as much as national assistance was as recently as 1948. So why worry about the poor?"

There are many reasons why we should worry. Poverty, as Peter Townsend and others have repeatedly pointed out, is relative. We cannot accept some absolute standard of subsistence, below which people are poor because they are hungry and inadequately sheltered from the elements and above which people are not poor because they have some basic minimum in terms of food, clothing and shelter. If the great majority of the population has a standard of living which allows them to go on holiday, to travel to open spaces or to friends and relatives, to have a telephone, to own consumer durables that ease the chores of day-to-day living, to possess new clothes that make them feel

good as well as keeping them warm, to be able to eat from time to time a delicacy as a treat, then to be unable to purchase such things is to be poor. That a substantial minority of the British population falls into this category is now well-established, though arguments will continue about how best to measure the exact size of this group. This fact means that many children grow up in an environment that may stunt their development and waste their potential. It means that many adults' lives are blighted by scrimping and saving and worry about how to pay the rent and the electricity bills and whether a visit to the butcher can be afforded. It means many young people feel bitter and resentful at their lack of opportunities and access to the good things that money can buy; some of them may resort to crime and violence as an alternative.

The failure of citizens of this country to recognize all this, which the EEC survey indicates, suggests the need for a massive programme of political education. Television is unquestionably the medium that is likely to reach the largest number of adults. David Donnison's book will be read by a small number of people many of whom will have long ago been converted to the humane, radical yet pragmatic views he holds about how to improve the lot of the poor through the intervention of the state - views incidentally which are largely shared by Susanne MacGregor. But the television programmes he is presenting at the moment are being watched by hundreds of thousands if not millions. The prejudice of some may be too deep-rooted to be touched by the arguments but others must surely be moved by the plight of David Donnison's poor clients in his five years as Chairman of the Supplementary Benefits Commission, from 1975 to 1980.

His book is not simply an account of the needs of those on supplementary benefits and how various reforms might best meet them. It is a story about public policy-making in Britain. It is about the relationships between civil servants and ministers, about the role of pressure groups and Parliament, about the influence of the trade union movement of which he is often critical, for being, as he puts it, militant rather than radical. On the face of it it is not an analytical book of the kind that political scientists might like. Yet it is full of insights on the processes of government, on the constraints and difficulties of change, and on the relationship between politics and policy. As such it should be widely read by students of political science and public administration. If there is any one theme that runs through it other than the author's dedication to the task of improving the plight of the poor, it is a passionate conviction in open government. David Donnison rightly implies that the task of persuasion is a job that should be done only by those who have been describing it. The Commission under Donnison has little difficulty in identifying the main priorities for reform: making the unemployed eligible for the higher long-term rates of benefit instead of isolating them as the underserving poor on short-term rates; the equalisation of women under the existing scheme; how to handle the cohabitation rule; the provision of a unified housing benefit for the poor; more help with both energy conservation and fuel costs for the poor; a better quality of service in social security offices round the country; and the reduction in the growing mass of discretionary payments.

It was the last of these that became the most pressing subject of the review of supplementary benefits. The priority that was given was partly a question of expenditure. Most of the other necessary reforms would cost quite a lot to introduce. In fact agreement to undertake the review was only secured on the understanding that the overall impact of its proposals was to be no increase in total expenditure on the part of the state. However, this

was free to spell out some of the policy problems it faced and to rehearse some of the possible solutions to them. This was a victory which the Treasury found particularly hard to accept. It is the department of which Donnison is most critical. He discusses its attempts to censor what the Commission had to say as unsuccessful. He holds up for justifiable ridicule a Treasury letter saying that the report of the review of the Supplementary Benefits Scheme should not be published because of serious problems about the use of paper and the need for the HMSO to economize in its use. David Donnison's other contributions to openness included the setting up of a regular seminar which brought the "outside" experts into the department for discussions with the "insiders"; close and much more open contact with the pressure groups and journalists; and the carrying out of the review of the scheme relatively openly with, for example, extensive consultation of staff interests.

To those who have not experienced Whitehall from the inside these may not seem especially significant achievements. Many civil servants, however, and most ministers, are frightened of such moves and oppose them. It is a great credit to David Donnison that he did not concede anything to official conservatism and caution. He managed, for example, in spite of the Official Secrets Act to go on writing articles for publication without accepting that ministers' advisers could vet what he said. Moreover he convinced the civil servants who worked with him that openness had advantages. On the whole, however, his book is pro-civil servants. The analogy Donnison employs is that of couriers serving their king (minister) loyalty. He names and describes those with whom he worked closely, supplying the reader with little details of their personalities and abilities in most cases they are generous but accurate for he was on the whole fortunate in the team that worked on Supplementary Benefits at the time. Some of the failings of our civil service do, however, emerge. There is a desire to stick with the status quo and a resistance to considering priorities. There is the seclusion of senior officials from the grim world of poverty and deprivation, the view of academics as a menace, a disdain for research so that external research was seen as a "threatening intrusion to be kept at arm's length and internal research as of little value. Donnison's own view of research is that it should be seen as an "investment in the creation of productive social networks" widening the public and private policy debate through an enlarged group of experts - a view which he should pass on to Lord Rothschild for his current investigation of the SSRC.

The Commission under Donnison had little difficulty in identifying the main priorities for reform: making the unemployed eligible for the higher long-term rates of benefit instead of isolating them as the underserving poor on short-term rates; the equalisation of women under the existing scheme; how to handle the cohabitation rule; the provision of a unified housing benefit for the poor; more help with both energy conservation and fuel costs for the poor; a better quality of service in social security offices round the country; and the reduction in the growing mass of discretionary payments. It was the last of these that became the most pressing subject of the review of supplementary benefits. The priority that was given was partly a question of expenditure. Most of the other necessary reforms would cost quite a lot to introduce. In fact agreement to undertake the review was only secured on the understanding that the overall impact of its proposals was to be no increase in total expenditure on the part of the state. However, this



David Donnison, whose current television series "Hard Times" is based on *The Politics of Poverty*.

was not the only reason for focusing attention on discretion. While in theory discretion looked good because it allowed greater flexibility in meeting a range of unforeseen individual contingencies, in practice the system was cracking up under the strain of an ever-increasing number of discretionary payments. The rules for their administration had become so complex that neither the officials in the local offices nor their clients were being made on an arbitrary basis with inexplicable variations from one office to another. Clients were being subjected to various indignities in the cross-questioning they had to endure. Officials were overloaded and under heavy pressure from client organizations. There was clearly a need for simplification and for the strong assertion of the principle that the poor should be paid a sufficient income to cover their needs and allowed to spend it as they wished.

Critics of the review have said that for all the effort that went into it the outcome was small; a bit more for families with children, a bit less for pensioners, more information for the clients, a simpler scheme with fewer discretionary lump-sum payments, but a more efficient and humane system of administering those that remained. Others have questioned whether these small improvements will be lasting. Donnison's book convinces the reader that it was worthwhile if only because its author makes no rash claims and is modest about the consequences of his efforts and those of all the other participants in his story. There is, as he puts it, still a great deal of unfinished business to be completed if the problems the Commission identified as of high priority are to be solved. Moreover, the Supplementary Benefits Commission no longer exists to fight for change.

This is a fact which Susanne MacGregor laments; because she believes it means there will be fewer people to speak for the poor, although she where she does not spare the Commission from criticism. While David Donnison tells the inside story of reform attempts between 1975 and 1980, Susanne MacGregor critically reviews the way the poor have been treated in the British political system since the end of the war. She describes the "subordination of the poor" in the years of full employment and Butskellism. One can scarcely call it "academia-

pressure groups; the Tory Party, at least of all the Labour Party which she claims "has developed her ideas in social policy since the 1940s". She suggests that since the sixties its main priority has been to become a national party (surely it had achieved that by then) capable of managing the economy as well as the Tories. These are harsh judgments and over-simplified, and her final call for the transformation of the Labour Party into a socialist party carries little conviction unless we are told what it means for social policy and how socialist social policies can be implemented in government.

But this is a useful book. If a little over-critical, it provides a wealth of factual material about the incidence of poverty as well as about the political debates and political action that have surrounded it. The agenda for the future which it supplies is remarkably similar to that provided by David Donnison. Both authors agree that the solutions lie far beyond the narrow alleviation of poverty and in the pursuit of a more equal society in which power, status and work are more fairly shared as well as income and wealth. On this I cannot resist the temptation to re-quote a question from Susanne MacGregor's book. In 1959 Roy Jenkins wrote: "Any believer in social justice, or indeed any believer in a civilized society, must surely give a high priority to providing such an improvement [in living standards for the poorest fifth of the population]. Some... would give it an absolute priority. They would deny the right of those whose standard of living is already at or above the average to any further improvement until the submerged fifth had been given more or less equivalent benefits. I would not accept this extreme position. Neither the economic policy of a nation nor the political programme of a party is likely to achieve a successful dynamism if it is based solely upon the assistance of lame ducks."

An electoral victory for the Social Democrats with Jenkins as their leader does not look an attractive prospect for Britain's poor.

Tessa Blackstone is professor of education administration at the Institute of Education, University of London.

BOOKS

Hegelian idealism

Hegel contra Sociology

by Gillian Rose
Athlone Press, £18.00 and £6.95
ISBN 0 485 11214 0 and 12036 4

How long must it be before the social sciences are redeemed from the obsessive intellectual radicalism of the social scientists? There exists today a mass of empirical data concerning the general characteristics of human societies and also a number of theoretical approaches which are genuinely respectful toward the facts of social life. And yet the endlessly renewed quest to provide sociology in particular with adequate and defensible intellectual foundations still draws its devotees toward the mystifying traditions of idealist speculation against which nineteenth-century sociology could have been and, in the case of Max Weber, actually was

a salutary reaction. The attraction of Hegelian idealism in particular is not incomprehensible, even when its expressions sometimes seem to be. But it belongs less to the history of man's efforts to comprehend the truth of his nature and place in reality than to the attempts to conjure them away in a reinvented world. It belongs to the sphere of magic more than science even though it is quite possible that Hegel's own ambition was simply to express the complexity of the real in a philosophy that did not pretend to freeze the flow of reality in timeless propositions and equations which were preserved in the printed text. Hegel's work remains a priceless treasure chest for anyone who feels the need for every evidence of a permanence in our condition which would otherwise be compelling.

Gillian Rose's *Hegel contra Sociology* is a striking, learned but extreme example of the type of writing I have in mind. She describes it as "an attempt to retrieve Hegelian speculative experience for social theory, not by means of an ingenuous and ahistorical return to Hegel", but, first of all, by recognizing and discussing the intellectual and historical barriers which stand in the way of any such rereading. These barriers are constituted, first and foremost, by the prevailing "neo-Kantianism" of social theory. Neo-Kantianism is broadly conceived to include not only the Marburg School of Cohen and Natorp, which can be legitimately seen as providing the intellectual foundations for sociological positivism, and the Heidelberg School of Windelband and Rickert, from which Weber's work derives, but almost every recent social theorist including such left-Hegelian warhorses as Lukács and Adorno - to whom Dr Rose's last book was devoted. An in-depth analysis of the influence of neo-Kantian assumptions on the work of Durkheim and Weber and the consequent self-imposed limitations of mainstream sociology, serves as a prologue to the main body of the book which aims to provide a close reading of Hegel's major works interpreted - predictably enough - "in the light of his early radical writings".

What is meant to emerge from this reading of Hegel is that the philosopher had, through his analysis of the limitations of the thought of Kant and Fichte, provided in advance a model of speculative social theory which would not be subject to the limitations of neo-Kantianism, and would allow the critical social sciences to link analysis of the economy with a comprehension of the conditions for revolutionary practice. In short, what Marx did we are warned, Hegel himself tended to read through Kantian and Fichtean spectacles, and therefore underestimated the power of Hegelian theory. This "power" is contained in the Hegelian notion of the absolute: "The absolute" is not an optional extra. Hegel's philosophy has no

themes of the beginning and end of the book, makes it very difficult to estimate how far Gillian Rose succeeds in renewing Hegelian speculation as she intends. Beyond some sensible but not very original criticisms of Marxist and "bourgeois" sociological simplifications of a truly complex culture it is hard, indeed, to tell what her conclusions are. One is told that her critique of Marxism itself yields the project of a critical Marxism and that this critique extends not to Marx's analysis of *Capital* but to the interpretation of this analysis as a comprehensive account of capitalism.

But for all her strictures on the limitations of neo-Kantian social science there is, so far as I can see, nothing in *Hegel contra Sociology* to show that the Hegelian absolute, with its pretensions to knowledge that is more than partial and contingent, is anything other than a speculative fantasy which the more sober minds of the neo-Kantian movement did well to reject.

A grand framework

Charles S. Peirce: from pragmatism to pragmatism

by Karl-Otto Apel
translated by John Michael Krois
University of Massachusetts Press, £7.90
ISBN 0 87023 117 4

Karl-Otto Apel's reputation in Britain and America rests chiefly upon a collection of essays dating from the 1960s and early 1970s and published in translation last year as *Towards a Transformation of Philosophy*.

In these essays he seeks to revive and extend two central elements in German philosophy - Kantian transcendentalism, with its strong ethical impetus, and contemporary hermeneutics - largely by linking them with recent trends in the philosophy of language. At a pivotal stage he relies on the logic and semiology of Charles Sanders Peirce, the American author of pragmatism. Several of Peirce's ideas, in particular that of the dependence of the logic of inquiry on a community of interpreters (what he at one stage calls "logical socialism"), are at the heart of Apel's notion of the "communication community" as a basis for ethics.

Here in a thoroughly conscientious and competent translation, we have the groundwork for this interesting act of assimilation: a revised version of Apel's introduction to a German edition of some of Peirce's writings published in 1967. It comes with the bonus of a thoughtful introduction from Richard J. Bernstein, whose *Praxis and Action* (1971) presents an original American perspective on the key problem which integrates Apel's interpretation of Peirce. Like Bernstein, Apel begins his book by examining the ways in which major modern schools of philosophy claim to mediate between theory and practice. In comparing twentieth-century theory in European philosophy, especially towards neo-Hegelianism and neo-Marxism, with those of British and American philosophy, which emphasize language, logic and the philosophy of science, Peirce appears fully conscripted into the latter camp. The recent powerful resurgence of American scholarship on Peirce, for example, has tended seriously to underplay his metaphysical and cosmological preoccupations. Apel recognizes this, and identifies his introduction as, especially aimed at the German reader, who is "existentially or ideologically and dialectically inclined". For Apel Peirce's famous pragmatic maxim (identifying the meaning of the proposition with the empirical consequences of believing it true or false) is a constituent of a much larger and coherent whole. By starting with a critique of meaning, Peirce makes room for a sweeping evolutionary metaphysics in the vein of Hegel and Schelling.

The structure of the book is organized so as to expose a grand framework for Peirce's thought, very much in the German tradition. Peirce is seen to refine and extend Kant's "architectonic" structure for human thought, and thereby build a springboard for Apel's own theory of communicative ethics.

Thus despite repeated claims about a "developmental thesis" and the importance of his subject's contextual concerns, Apel's interpretation is finally ahistorical and timeless. In line with what is still the most challenging overall scheme, Murray G. Murphey's *The Development of Peirce's Philosophy* (1961), Apel posits four distinct stages in Peirce's intellectual biography. Unlike Murphey, however, who shows Peirce to develop and abandon different approaches to logical problems posed by his pragmatism, Apel's thesis is asymptotic, interpreting each stage in the light of the methodological principles inherent in the final articulation of "Pragmatism".

In many ways this retrospective and inclusive view is plausible and attractive. From 1855 until 1871 Peirce is shown to establish what Apel calls his "meaning-critical realism", an amalgam of Kantianism and medieval realism that draws his philosophy away from questions of "knowledge" and towards those of "meaning". From 1871 to 1884 this breakthrough provides the background for the American pragmatism. Then from 1884 until 1902, exiled from academic philosophy after his dismissal from Johns Hopkins University, Peirce is shown to defend the position he had reached against dangerously sympathetic alternatives like the Absolute Idealism of Josiah Royce. Finally, between 1902 and his death in 1914, Peirce lays out his arguments for "Pragmatism".

"Pragmatism" was, of course, like the third stage, essentially defensive. William James meanwhile had harnessed the pragmatic maxim to the subjective, almost existential theory of meaning expressed in his essays like "The Will to Believe". Peirce, horrified but relatively powerless, was determined to preserve the teleological thrust of his philosophy, emphasizing not only intersubjectivity but also the final coherence of all experience: the creation of the universe, which did not take place during a certain busy week, in the year 4004 A.C., but is going on today and never will be done, is this very development of Reason.

Apel's sympathy for this stance, which serves his own philosophical purposes by establishing the prior structure of human communication, results in a version of Peirce that is systematic, consistent and unified, and would be recognizable to many of Peirce's recent American disciples. For this reason alone it will add some spice to the literature on Peirce in English.

David Watson

Dr Watson is deputy of the modular course at Oxford Polytechnic.

Cultural forms

Structures of Thinking

by Karl Mannheim
edited and introduced by David Kettler, Volker Meja and Nico Stehr
Routledge & Kegan Paul, £14.00
ISBN 0 7100 0936 4

There has recently been a welcome revival of interest in the work of Karl Mannheim, who is still, almost forty years after his death, the dominant figure in the sociology of knowledge. This book is a translation of two manuscripts, one unfinished and the other sixty years old, whose very existence has been largely unknown and which the editors describe as methodical notes. They are, however, by no means ephemeral; they represent important texts both for Mannheim scholarship and for the sociology of knowledge in general.

The central point of debate in the interpretation of Mannheim's work is whether to see him as a hermeneuticist, centrally interested in understanding culture, or as a structuralist, emphasizing the importance of explaining culture. It is generally agreed that Mannheim was more of a hermeneuticist in his earlier work, and the two essays in *Structures of Thinking*, written in the 1920s, illustrate these earlier concerns. Most important, Mannheim wished to represent the richness and plurality of cultural forms. Thus, he had a marked antipathy to the use of the positivist methods of natural science in sociology for they appear to invalidate culture. The same is true of Marxism, which Mannheim mistakenly understood to reduce culture to economic determinations. Similarly, those philosophies of history that try to interpret every cultural form as a manifestation of "timeless reason" ignore the way in which culture has myriad faces approached from an infinity of perspectives.

These themes betray a style of thinking which Mannheim himself would have called conservative and

which appears in various different guises throughout his work. In these texts Mannheim is attempting to turn this fundamental habit of mind into a method which will steer a course between an approach which understands cultural forms, but cannot explain them, and one that purports to explain, but cannot empathize.

The first essay is more coherently successful in this attempt. Mannheim distinguishes immanent from genetic interpretations. In the first, cultural forms are understood in their own terms, while in the second the analyst has to demonstrate their origins. Proper genetic interpretations in the sociology of culture are not positivist however. Instead, cultural phenomena have to be interpreted in relation to their "functionality" in the experience of a social group. The second essay, Mannheim similarly insists that the relationship between society and thought is not a relationship between non-spiritual and spiritual entities. On the contrary, apprehension of the social world itself has to be mediated by the meanings given to it. Consequently, the sociological analysis of culture is an analysis between two, perhaps different, provinces of meaning, society and culture.

The editors, in their useful introduction, appear doubtful of the success of Mannheim's project. They are quite justified in their scepticism. Mannheim does not resolve the tension between explanation and understanding. It is not clear, for example, what force attaches to the notion of functionality, nor what method allows non-causal analysis of the relations between provinces of meaning. In this book as in all his earlier work, Mannheim inclines more to hermeneutic interpretation, leaving the manner in which society determines thought obscure.

In making this text available, the editors have performed a useful service for interpreters of Mannheim's change of position over questions central to the sociology of knowledge.

Nicholas Abercrombie

Nicholas Abercrombie is lecturer in sociology at the University of Lancaster.

MUSSOLINI

Denis Mack Smith

'[An] excellent biography. It is a work of careful scholarship... it is difficult to see how it could be surpassed' - David Hunt, *Listener*

'Mr Mack Smith has enormous learning lightly worn. He has synthesised the huge literature in Italian on Mussolini. He has succeeded in the difficult psychological task of portraying a man who daily constructed his personality afresh' - John Vincent, *Sunday Times*

'Brilliant... the most compulsive reading of any book of modern Italian history that I ever remember to have read' - Owen Chadwick, *Spectator*

'Mack Smith is a scholar of high rank. Here he gives us all the facts and also all the drama of Mussolini's life' - A. J. P. Taylor, *Observer*

'Though written for the general reader, there is no question of Mr Mack Smith's command of his subject and the power of his thesis... a sober and sobering study' - Zara Steiner, *Financial Times*

'... splendid new book, a political biography which is thorough, yet concentrated' - J. M. Roberts, *Daily Telegraph*

'[Mr Mack Smith's] superb biography, erudite, subtle and constantly exciting' - *Economist*

On sale now £12.95

Weidenfeld & Nicolson

BOOKS

Opium and social control

Opium and the people: opiate use in nineteenth-century England by Virginia Berridge and Griffith Edwards
Allen Lane, £20.00
ISBN 0 7139 0852 1

The collaboration of a professor of addiction behaviour and an historian has been a successful here that this book makes a simultaneous and significant contribution to the history of medicine, to the understanding of nineteenth-century English society, and to the analysis of present-day addiction problems.

Griffith Edwards has brought present-day professional knowledge to bear on medical situations in the past, while Virginia Berridge has ensured that the book is both free of medical and sociological jargon (only once does the book descend to that ugly and redundant adjective "societal") and avoids that self-congratulatory tunnel-vision typical of the amateur historian writing the history of his profession.

Of the book's two major themes, the first is England's vast opium area before the 1870s. Easily obtained at the corner shop from retailers often ignorant of its properties, it was recommended almost indiscriminately by doctors and used freely by patients in self-medication. Famous addicts like De Quincey and Coleridge seem less unusual when seen against this background, and in some areas opium-eating became almost a way of life. In the Fen district, for instance, the "Fen tigers" — those small, dark people from the remotest areas — bought large quantities of the drug for themselves and their animals.

This regular drug-taking seems to have been less harmful than one might expect, and reminds the authors of modern South-East Asia. Death-rates from opium poisoning were low in the circumstances, and neither the death-rate nor the consumption-levels were increasing. Yet mid-Victorian doctors exaggerated the dangers of opium and overdramatized the threat posed by the three types of drug that arrived rather later on the scene — morphine, cocaine and cannabis — none of which generated a sub-culture whose distinguishing feature and major preoccupation lay in drug dependence.

The book's second major theme is the way doctors — in alliance with civil servants, statisticians and the police — exploited the situation for their own professional purposes. Doctors' alarmism helped secure the Pharmacy Act of 1868, which required addictive drugs to be labelled as poisons and made them available only under medical supervision. In the words of Berridge and Edwards doctors "became the custodians of a problem which they had helped to define". From there they never looked back. Purgative late-Victorian patent medicines of their opiate, they also moved into the business of offering morphine and even punitive cures; but their approach was "essentially drug-centred", and lacking a social dimension.

During the twentieth century the doctors' influence ensured that in England, unlike America, the addict was defined as a patient rather than as a criminal. In England "not only opium but the addict was to remain medical property". None, the less, the authors claim, twentieth-century doctors everywhere have collaborated to promote images of addiction which will justify structures of international policing and control, together with large research-grants for their own profession.

All this is difficult material to handle, for Berridge and Edwards are pioneers in an ill-documented area, and comb through evidence of many types: interviews, manuscripts,

periodicals, official papers and secondary works. A good index, an adequate bibliography, extensive footnotes and photographs are all provided. But will the reader accept the overall argument, with its rather modish scepticism about ideals and altruism as influences on human conduct, and with its relative indifference to the internal intellectual history of the doctor's long-term dedication to research and cure?

Reflecting a current wariness of governmental pretensions and distaste for the "arrogance" of nineteenth-century attacks on popular culture, recent social historians of medicine dwell upon the doctors' alarmism, their class prejudice, their responsiveness to ephemeral fashions and their tendency to replace the old hazards with new in their quest for professional status. It is a new orthodoxy which makes one wonder sometimes whether the doctors can ever do right.

Thus the authors detect class interest when doctors show more concern about working-class opium-taking and working women "doping" their babies with Godfrey's Cordial than about middle-class recreational drug-taking; their priorities are seen as contributing to a vaguely-conceived "social control", or as diverting attention from more serious social injustices. Yet the class interest seems unaccountably to vanish when elsewhere in the book they accuse the doctors of fussing unduly about middle-class addiction to morphine. The doctors' concern about opium deaths is seen as "a form of professional self-definition and a validation of a doctor's expert status". Yet this theme is somewhat overdone when the authors lay such emphasis on the prominence of the public health movement in giving doctors control over access to drugs, for that movement initially constituted an attack on the medical profession, at least in its medicine-prescribing aspect; for the sanitarian doctors could become redundant if people would only adopt healthy habits in a healthy environment.

Berridge and Griffiths also fail to remind the reader of the miseries of

The age of saints

The Abbey of St Germain des Prés in the Seventeenth Century by Maarten Ultee
Yale University Press, £14.00
ISBN 0 300 02562 9

In his introductory chapter, Maarten Ultee reflects on the desirability of a study which would embrace the intellectual, political, social and economic aspects of monastic reform in seventeenth-century France. Indeed one lack of any such survey, in English at least, dealing with the French Catholic Reformation as a whole.

Thanks to the work of John Bossy some aspects affecting the secular clergy and laity have become familiar to the anglophone student, but monastic reform has remained virtually unknown apart from the introduction or foundation of new orders in the so-called "Age of Saints". Projects for the reform of all the major existing orders also flowered in these early decades of the century, and usually involved a re-orientation to the stricter observance of their founders' rules. Among the Benedictine congregation of St Maur was one of the most distinguished of the reformed groups, and the abbey acquired a reputation for its high standards of scholarship, particularly in historical writings.

The wealthy Parisian abbey of St Germain was recruited to the St Maur congregation in 1631 and forms the subject of the present monograph. Having renounced the task of writing a general survey, Ultee narrows his horizons, virtually omitting the intellectual and political dimensions of reform. The brief account of the acquisition of the abbey by the Maurists relies heavily on secondary sources, so the opportunity to investigate a potentially fascinating area — the structure of Louis XIII's government and the Gallican debate — is lost. Although he emphasizes St Germain's special role as a royal

drug addiction. Only incidentally do they acknowledge that the doctors were at least sometimes faced by a major problem, that "people did die unnecessarily from accidental overdoses" and that babies were indeed "doped by their mothers". Readers need this context if they are to comprehend the drastic remedies doctors were sometimes allowed to recommend.

These remedies, however, are seen as reflecting doctors' moralistic zest for "punishment", and analogies are drawn with the prison regime. Yet the doctor was surely not alone in seeing confinement as a desperate but reluctant, commonsense expedient in tackling a problem that could be so devastating. Public opinion allowed governmental infringements of personal liberty here that were often stoutly resisted elsewhere — for example, in the fight against smallpox and venereal diseases. The allegedly sinister alliance between doctors, official statisticians and enforcement agencies continues to force in the twentieth century, yet it enjoys support from all but a doctrinaire or commercially self-interested minority among the general public, for it reflects a widely-felt need to tackle the causes of cancer and to reduce accidents on the roads and in the factories.

One final criticism emerges: the rather surprising failure of the last chapter — relatively loosely written by comparison with the rest — adequately to link the historical material to the present-day situation. The nineteenth-century doctor's much criticized interventionism was followed, admittedly at an interval, by a permanent decline in infant and adult mortality from opium use. If the last chapter had supplied twentieth-century statistical tables of drug consumption and mortality, and complemented this by analysing twentieth-century restrictive legislation, the reader would have found it easier to evaluate the long-term contribution of drug restriction to this overall improvement.

It is one of the book's strengths that Berridge and Edwards aim to inform current discussion on drug

addiction with a historical analysis that avoids tearing historical information out of its contemporary context as mere "background". Yet their scholarly pursuit of historical perspective has been carried so far that they have been coy about clarifying their own standpoint on current policy. Hints on their attitude towards the present-day treatment of drug addiction appear here and there, but tentatively, obliquely, or too late in the book. Yet their attitude informs the whole of their historical analysis, whose links with the present would be more tightly drawn if it were spelt out more clearly.

They even sometimes suggest, though they never go so far as to recommend, that nineteenth-century British experience with free access to drugs might justify libertarian experiment in the 1980s. They are, so to speak, the Derek Rayners and the Keith Josepchs of the morality department, though their own peculiar route towards the decline of serfdom is unlikely to be pursued by the present government. Yet so great are the implications of the libertarian standpoint that one might have expected it to be explained and justified more fully.

Such discussion would have highlighted our confused muddle over remedies for drug-taking, and led to more sympathy for those later Victorian doctors' confused outlook on the role of human free will. Like doctors today they incurred all the odium attaching to professions which are obliged to take action in areas where society as a whole has not yet made up its mind.

But this is perhaps to ask the authors for another book, this time on the twentieth-century history of the policy on drug-addiction in England. Given their monumental labours here, such a request perhaps asks too much. Yet it is testimony to their achievement that such a book seems now more urgent than ever.

Brian Harrison

Brian Harrison is a fellow of Corpus Christi College, Oxford.

abbey, which was reflected in its elaborate ceremonial life, there is no explanation of who at court supported reform, how the eclipse of the *dévôts* affected the progress in view of the fact that there are also tantalizing references in the text to Richelieu's involvement at some unspecified period. It is very difficult to gauge how far the experience of St Germain was typical and it is a pity that, having acknowledged the absence of a broader framework of comparison, Ultee could not have provided some hints in the direction.

It would, however, be vain to expect much political detail in a work which is influenced by the Annaliste school. The author has certainly investigated some of the areas of concern of recent French historians, for example the composition and colorific value of the monks' diet and about two thirds of the text is concerned, one way or another, with economic matters. In dealing with the landed revenues of the abbey, Jacques and Marc Venard to provide a wider context; where they provide the story of the abbey's *fermiers*, Ultee looks at the relative success of the abbey itself in increasing its income through the so-called tragic century. These chapters dealing with income, borrowing and expenditure are among the most interesting, although Ultee falls to make the obvious point that the monastery had none of the obligations imposed on lay landowners by the secular events such as inheritance and marriage.

These chapters which concentrate on economic issues are more convincing than those in which Ultee tries to assess the relationship of the abbey to its secular neighbours; the evidence here is thin, and it tends to show, indeed the obvious balance and structure of the book with its somewhat cursory investigations of the social, intellectual and spiritual life of the community framing its economic core, reflects the very distasteful of the membership of the 1693, so the chapter on demography has to deal with that of the con-

gregation as a whole. The book is, on the whole, beautifully produced, with well chosen illustrations, but it is a great pity that a little more space is not devoted, in text or notes, to explaining the detailed calculations and, in particular, to providing fuller annotation of graph 5 whose basis remains incomprehensible without research into life tables.

J. M. Davies

Dr Davies is lecturer in history at the University of Essex.

Ministry men

Revolution and Red Tape: the French ministerial bureaucracy 1770-1850 by Clive H. Church
Clarendon Press: Oxford University Press, £22.00
ISBN 0 19 822562 8

The French have always mistrusted bureaucrats, but have eagerly sought to become bureaucrats. That paradox holds true for the revolutionary years 1770-99, which form the core of Dr Church's book, and for the period 1770-1850 which he discusses more generally.

Dr Church is concerned with the lower echelons of the administration and in his conclusions the emphasis is laid, in the words of an overworked historical phrase, on "continuity" rather than "change". Where historians of the higher bureaucracy have claimed that the development and composition of the civil service reflected the priorities of each successive revolutionary and post-revolutionary regime, Church has shown that the lesser employees were much less affected by such political upheavals. All governments needed their services and they therefore survived in office, despite popular concern, shared to a degree by those in power, that their loyalty

might be to earlier rulers and that they were therefore enemies of the present state. This lower civil service was expanded during the first revolution, consolidated in 1792, presented by the Directory, further enlarged by Napoleon and bequeathed intact to the restored Bourbons. There was continuity in both its procedures and its personnel.

Whatever the suspicions about their loyalty, these humble officials were prepared to serve the government of the moment as best they could. They were concerned not with politics but with the problems of running an ever more complex and detailed administration, with the preservation of their jobs. There was a wide gulf between them and the upper bureaucracy into whose ranks they were very rarely promoted. In the revolutionary decade, the civil service acquired an esprit de corps, separating it from the political world which it served. Between 1789 and 1848 it also became more organized, more hierarchical, more impressive, more qualified, better paid, increasingly the prisoner of its own developing routine and steadily overwhelmed by the growing demands made upon it — all of which had the effect of stifling initiative.

Of necessity, these insignificant "men from the ministries" made dull subjects for historical inquiry. They remain either names or statistics, for insufficient is known about them to bring them to life as people, and many have such common names that they cannot be distinguished from one another. Dr Church has laboured long at this unenviable task, and has undoubtedly contributed to our knowledge of the period — as every doctoral thesis should. He has been less successful in expanding it into a book, for the densely factual and statistical section on the Directory is now surrounded by chapters which are rather too general and at times off course. His judgment becomes noticeably shaky as he goes further into the past, as his account of the *ancien régime*'s oversimplified and on occasion inaccurate. He is aware of some recent controversies among eighteenth-

century historians, but sometimes seems to miss the point of the debate. He also repeats too many of the conclusions reached by other, easily accessible historians, although his selection from this secondary literature are, to say the least, partial. He has, moreover, obscured his narrative by using both the revolutionary and Gregorian calendar, never relating one to the other, and by assuming that everyone will know which events are being alluded to when he merely cites a revolutionary month without a year.

If the publishers can perhaps be rebuked for allowing these flaws to creep into the book, they can the content of the book, they can surely be castigated for permitting some of the atrocious errors in its production. A first reading revealed punctuation. A further 105 mistakes in French words, some occurring more than once, suggested not just carelessness but an inadequate knowledge of the language. Accents, genders and agreements are wrong, and the English versions of words have influenced the spelling of the French. In Table III there are 17 errors, which evidently pleased readers of the *Almsworth's* magazine. Surtees particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray, whose work he particularly admired and affected, Thackeray — the greater novelist — modestly disclaimed the necessary to find my pictures anything but comic" and suggested his *Punch* colleague, John Leech, *Punch's* publisher, Bradbury and Evans, were also Dickens's; they suggested revision on the Dickensian pattern — monthly instalments from January 1849-April 1851, under the title "Soapy Surtees's Sporting Tour". Sporting subjects and illustration go well together and in his search for an illustrator for the reprint of his novel which evidently pleased readers of the *Almsworth's* magazine) Surtees approached Thackeray,

BOOKS

Beyond the bulge

Evaluating the Evaluators
by Maurice Holt
Hodder & Stoughton, £3.45
ISBN 0 340 27245 7
Education in Jeopardy: problems and possibilities of contraction
by W. F. Dennison
Blackwell, £9.95 and £3.95
ISBN 0 631 12548 5 and 12889 1

Two of the most pressing issues facing schools in the 1980s, the evaluation of schools and falling rolls, are addressed in these books. Both issues threaten established practice, but equally both might produce some residual benefits.

Maurice Holt's analysis of school and teacher evaluation is written in an engaging narrative style, reflecting, perhaps, the considerable detective work he has needed to do to assemble some of the relevant evidence. After an opening chapter in which he describes the nature and scope of evaluation in education, he devotes most of the first half of the book to the American and British national evaluation exercises. The establishment of the Assessment of Performance Unit by the Department of Education and Science was a significant development in this country, and Holt has searched meticulously through HMI and DES papers, newspaper accounts, reports of visitors, policy statements and other sources, as well as engaged in private correspondence with some of the people centrally involved. In this respect this book, though written by an outsider, is probably the most intimate account we have yet had of the evolution of the APU, and has more detail on such matters as the debate about testing in the field of personal and social development than any other book published to date.

In the second half Holt turns his attention to the local level and discusses local authority testing, the appraisal of schools and self-evaluation. There is a description of the National Foundation for Educational Research LEASIB project, which allows test centres access to national test items, banks, and a short case study of a school self-evaluation, which the author monitors.

Although the book gives a very thorough review of national and local evaluation, there are two aspects of it which are disappointing. First, much of the section describing the APU is pervaded by a strong suggestion of conspiracy by the DES, which is based more on innuendo than clear evidence. Secondly, the reader is left with no clear picture of what forms of evaluation are acceptable to the author. National and local authority testing are ruled out, and so are checklists for schools of the kind produced in London and Solihull. Stenhouse's concept of the teacher as researcher in his or her own classroom is said to be "uncongenial" because it is too specific and formal, and the practice of asking the head or a senior person in the school to follow a class around for the day is dismissed as not leading to "a study of fundamental issues".

The author seems to hope that if more effort is put into curriculum development then the teacher becomes accountable to himself and enjoys his teaching. But the notion that accountability in education is largely a private matter indefensible and a little bizarre in view of the vast sum of public money spent on it. Nevertheless the book is stimulating, provocative, readable, and rightly counsels against too crass a reliance on the more insensitive, bureaucratic and mechanistic approaches to the evaluation of children's education. No one will fail to sleep reading it.

W. F. Dennison's book *Education in Jeopardy* is based largely on existing data about falling school populations already published in White Papers, DES reports and other sources. It is, however, most useful to have so much available

detail in one volume. Some of the key tables underline the massive scale of expansion and contraction over a twenty or thirty-year period. The expansion of the teaching profession has certainly been rapid. In 1950 there were just over 300,000 teachers. The total reached 300,000 in 1965 and 400,000 in 1973. The same period saw school populations grow from 5.65 million to 8.51 million pupils.

The fall in births from the peak of 876,000 in 1964 to the low of 569,000 in 1977 has already devastated primary schools as well as many secondary schools in inner-city areas and its effects will ripple through higher education at the end of the decade. Dennison gives a sound analysis of the effects of falling rolls on teachers, curriculum, non-compulsory education and consumer choice, citing, in addition to the published demographic data, studies such as those by Bernbaum (1979) and Briault and Smith (1980). One missing dimension, however, is the experience in other countries; it would have been most helpful to have been given comparisons with Canada and parts of the United States where the problem has already been faced, or with West Germany, where the demographic pattern is close to our own. In the United States many threatened rural schools saved themselves by attracting greater community involvement. The final chapter, unfortunately too brief, deals with the challenge of making a virtue out of contraction by better management of resources. This is unquestionably one of the most taxing problems facing senior people in schools and administration, and the topic would justify a book in its own right.

E. C. Wrang

E. C. Wrang is professor of education at the University of Exeter.

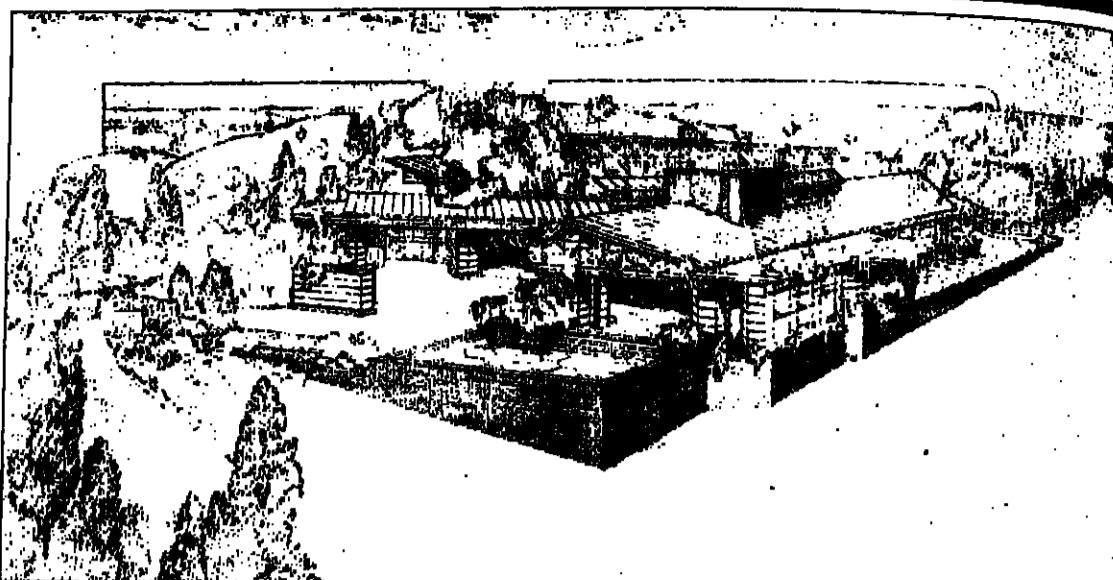
Paving the way

Help Starts Here: the maladjusted child in the ordinary school
by Israel Kolvin, et al
Tavistock, £25.00
ISBN 0 422 77380 8
Educating Pupils with Special Needs in the Ordinary School
by Seamus Hegarty, Keith Pocklington and Dorothy Lucas
NFER-Nelson, £14.45
ISBN 0 85633 234 8

As the days of expansion in providing segregated special education are over, those concerned about children with special needs are looking to those who can provide effective help for them in ordinary schools. The Warnock report and the 1981 Education Act raised the hopes of parents of handicapped children and of educators wishing to see a more effective system of education for all children. But the prospect of integration clear how this goal is to be attained. These two important and timely books go some way towards allaying anxieties.

Teachers will find Seamus Hegarty and his fellow authors more helpful than Israel Kolvin and his team, whose study is more adventurous and more problematical and is concerned only with maladjusted children. Hegarty, Pocklington, and Lucas look at integration of all children with special needs, with the maladjusted receiving only slight attention. Although the programmes for maladjusted children were based in ordinary schools, describing them in ordinary schools is about the gains to the ordinary school system that successful integration programmes bring about. That do Hegarty and his co-authors for whom it is a major theme.

The Kolvin study had for its aim the identification of maladjusted children in the ordinary school system and evaluation of the effectiveness of school-based treatment programmes. It describes how 1000 children in their first year in six junior schools in Newcastle and Gateshead and 3300 first-year children in six senior schools in the same area were screened for signs of social or



An early preliminary drawing by Frank Lloyd Wright for the house he designed for Paul R. and Jean S. Hanna. The story of the evolution of the house's famous "honeycomb" design is told in Frank Lloyd Wright's Hanna House: the clients' report, which is written by the Hannas themselves and published by MIT Press at £17.50.

psychiatric disturbance or learning problems. The multiple screening revealed as maladjusted 270 juniors and 322 seniors, who were then randomly assigned to treatment or control groups.

The treatment programmes for the juniors were parent counselling-teacher consultation undertaken by six social workers; play groups organized by social workers; and nurture work with teachers and teacher-aides. The senior children were allocated to parent counselling-teacher consultation; group therapy led by social workers; behaviour modification directed by teachers. There were 67 "at risk" controls and 203 children participating in treatment at the junior age, and 92 maladjusted controls and 230 children in treatment at the senior age. The treatment programmes were based in 12 schools, and staff involved were given short training courses. Changes in behaviour and performance were evaluated by outcome measures based on three ratings (at baseline, eighteen months, and three years) made by clinicians unaware of children's group allocation, and by improvement on individual measures comparing base line with follow-up data.

The results showed that the most effective, cheapest and speediest treatments were behaviour modification and group therapy/play group participation. Least effective was the parent counselling-teacher consultation. The effectiveness of the group therapy contradicts Levitt's findings on the effectiveness of psychotherapy with children, for in contrast to treated children and untreated controls improving at the same rate, 75 per cent of those in group therapy had good outcomes at follow up compared with 39 per cent of the untreated controls.

Other findings included confirmation of the resistance to treatment of conduct disorders in boys. It was also discovered that treatment effectiveness tends to increase with time; that neither sex nor diagnostic categories have much bearing on differential responses to treatment; and that the most effective therapists operated in the short term and were characterized by "therapeutic assertiveness". Personnel who had short periods of training were as effective as long-term trained professionals.

It is unlikely that the methodology and the conclusions of this complicated study will go unchallenged, but it points the way to better understanding of how maladjusted children can be helped in ordinary schools. What the book does not do and cannot do, is to account for the contribution to successful treatment made by individual enthusiasms and commitment. Nor do the authors pay enough attention to the fact that the supports provided for all the treatment programmes involving economic blizzard periods.

The cost of integration is one of the many topics explored in the book by Hegarty, Pocklington and Lucas, and it is certainly going to be considerable. (£519,000 is the capital cost of integrating 60 physically handicapped children in a comprehensive school at 1975 prices.)

They are clear that effective integration is expensive, as they are about its meaning and its effectiveness. In their book, based on the study of 17 integration programmes in 14 local authorities, they consider every aspect of integration, giving sound advice to those who will implement it. It is not an enthralling book, but as the authors plod through such topics as preparing children, parents and staff for integration, training of ancillary workers and teachers, assessment, recording and curriculum, there emerges a convincing description of the desirability and possibility of including many more handicapped children in the ordinary school system. The evidence that this would benefit them and our educational system is overwhelming.

We have waited for such a book and are at last rewarded: it is one that can be given to administrators to show them what they should do and to teachers to show them how to do it.

Black colleges were innovative also in experimenting with ways of effectively involving students in governance and community services, and combining C. P. Snow's "two cultures" in a single curriculum, decades before white colleges moved in these directions. Black colleges led the way in desegregation, in implementing open-admissions policies, and in establishing informal tutorial and counselling schemes for promising or problem students.

The book argues that black colleges still lead in educational philosophy, and that their educational philosophy is bound to be adopted by white colleges in the future. Black colleges value, as institutional goals, teaching their students to strive for justice, and to have a sense of responsibility towards the poor, downtrodden and afflicted. They have ways kept honesty, justice, altruism, action and sacrifice before their students as proper goals for higher education.

The second main thread of the book is a passionate conviction of the value, to blacks and whites, of a racially integrated education: a conviction unfashionable in America today. Professor Willie delivers a blistering attack on standardized testing, and on the use of group names, labels and stereotypes in educational materials; he examines the fairness of present techniques for selecting a racially diversified student body; compares the experiences of minority white students in black colleges, and of black students in both black and white colleges, scrutinizes their recruitment and financial aid policies, and advocates black studies departments.

The impact of *Ivory and Ebony Towers* stimulating and wide-spread material is reduced by the form in which it is presented. Some of it is naturally specific to America, but it has a great deal that is relevant to the situation in British courses can be transposed to the experience of the inner city studies may be more acceptable. On the basis of his sociological surveys, Professor Willie recommends student bodies composed of minority races to a proportion of at least 20 per cent, if their full educational value is to be realized.

He will no doubt be considered naively idealistic when he suggests that no one is unworthy or incapable of higher education, and that it is the inappropriate structure that prevents us from offering higher education to all. Naive, idealistic, or otherwise, considered seriously as a rapidly changing world in which traditional higher education is under threat.

This does not mean that Professor Willie has nothing or little of value to say, or that there are no predominant themes. The volume has two main threads that hold it together. The first of these is a concern to defend black colleges against well-meant attacks by black people on the one hand, and ignorant attacks by white educationists on the other. Black people apparently ask whether society should perpetuate black colleges now that white colleges are open to black students and, in some cases, are actively recruiting them. While educationists who use traditional white criteria that focus exclusively on cognitive knowledge, and who are ignorant of the distinctive tradition of black colleges, have gone so far as to call them "academic disaster areas". Perhaps partly because of their minority status, blacks have tended to view education as liberating: they have placed cognitive development alongside emotional, social, moral, and spiritual develop-

ment. Thus, argues Professor Willie, the greatness of Martin Luther King, Jr was a direct result of what he learned at Morehouse College: his achievement would be impossible for the alumni of white colleges, because present white understanding of education is limited.

Black colleges were innovative also in experimenting with ways of effectively involving students in governance and community services, and combining C. P. Snow's "two cultures" in a single curriculum, decades before white colleges moved in these directions. Black colleges led the way in desegregation, in implementing open-admissions policies, and in establishing informal tutorial and counselling schemes for promising or problem students.

The book argues that black colleges still lead in educational philosophy, and that their educational philosophy is bound to be adopted by white colleges in the future. Black colleges value, as institutional goals, teaching their students to strive for justice, and to have a sense of responsibility towards the poor, downtrodden and afflicted. They have ways kept honesty, justice, altruism, action and sacrifice before their students as proper goals for higher education.

The second main thread of the book is a passionate conviction of the value, to blacks and whites, of a racially integrated education: a conviction unfashionable in America today. Professor Willie delivers a blistering attack on standardized testing, and on the use of group names, labels and stereotypes in educational materials; he examines the fairness of present techniques for selecting a racially diversified student body; compares the experiences of minority white students in black colleges, and of black students in both black and white colleges, scrutinizes their recruitment and financial aid policies, and advocates black studies departments.

The impact of *Ivory and Ebony Towers* stimulating and wide-spread material is reduced by the form in which it is presented. Some of it is naturally specific to America, but it has a great deal that is relevant to the situation in British courses can be transposed to the experience of the inner city studies may be more acceptable. On the basis of his sociological surveys, Professor Willie recommends student bodies composed of minority races to a proportion of at least 20 per cent, if their full educational value is to be realized.

He will no doubt be considered naively idealistic when he suggests that no one is unworthy or incapable of higher education, and that it is the inappropriate structure that prevents us from offering higher education to all. Naive, idealistic, or otherwise, considered seriously as a rapidly changing world in which traditional higher education is under threat.

This does not mean that Professor Willie has nothing or little of value to say, or that there are no predominant themes. The volume has two main threads that hold it together. The first of these is a concern to defend black colleges against well-meant attacks by black people on the one hand, and ignorant attacks by white educationists on the other. Black people apparently ask whether society should perpetuate black colleges now that white colleges are open to black students and, in some cases, are actively recruiting them. While educationists who use traditional white criteria that focus exclusively on cognitive knowledge, and who are ignorant of the distinctive tradition of black colleges, have gone so far as to call them "academic disaster areas". Perhaps partly because of their minority status, blacks have tended to view education as liberating: they have placed cognitive development alongside emotional, social, moral, and spiritual develop-

ment. Thus, argues Professor Willie, the greatness of Martin Luther King, Jr was a direct result of what he learned at Morehouse College: his achievement would be impossible for the alumni of white colleges, because present white understanding of education is limited.

Black colleges were innovative also in experimenting with ways of effectively involving students in governance and community services, and combining C. P. Snow's "two cultures" in a single curriculum, decades before white colleges moved in these directions. Black colleges led the way in desegregation, in implementing open-admissions policies, and in establishing informal tutorial and counselling schemes for promising or problem students.

BOOKS

MATHEMATICS AND PHYSICS

Quantum basics

Quantum Mechanics
by Hendrik F. Hameka
Wiley, £24.00
ISBN 0 471 09223 1

Basic Quantum Mechanics
by J. L. Martin
Clarendon Press: Oxford University Press, £17.50 and £7.95
ISBN 0 19 851 815 3 and 816 1

Quantum Mechanics
by Alastair I. M. Rae
McGraw-Hill, £6.95
ISBN 0 07 084127 6

All three of these books are aimed at the undergraduate physics market (roughly second-year physicists in Britain or senior-year physicists in the United States) and also (in Hameka's case) at graduate chemists. In trying to assess them I have had in mind various tests, such as style, sensitivity, and novelty of presentation, and have gauged them against my own views (with which others may disagree) about the best way of presenting basic problems: the harmonic oscillator, angular momentum, and the hydrogen atom. There is an increasing tendency to include discussions of conceptual and measurement problems in elementary accounts of quantum theory. The books by Martin and Rae each devote a chapter to such problems, whereas Hameka (perhaps reflecting his background as a chemist) deals with them only in passing.

Hameka's book is better regarded as a second edition of his earlier *Introduction to Quantum Theory* (1967), and some readers will be familiar with the earlier package (but shy the change of title and its presentation as a new book?). It conveys the impression of an author anxious to teach well and to explain an intricate subject to his audience, and one well-disposed towards undergraduates' difficulties. Nevertheless, the subject is treated too loosely for my own taste, and a number of crucial aspects are presented too casually.

A strategic decision was taken to give virtually every detail of the calculations, the result being that the mathematical details such as matrices, determinants, and differential equations. This last leads the reader to the hydrogen atom and the harmonic oscillator by way of confluent hypergeometric functions. I suspect, however, that the unification which suggests itself remains unappreciated, especially as there is relatively little physical interpretation of any of the conclusions obtained.

Martin's book moves quickly and wisely, occasionally using computer illustrations (their printed density for the n th state) is not in line with that of almost any other book on quantum mechanics. Rae's book, has struck attractively, exactly the right note in excess of rigour, and is informal in style and relaxed in tone. It also contains a less, and is significantly lower in its level of exposition. I suspect that undergraduate students will find it most congenial of the three.

Martin's book takes a refreshingly different line from many introductory texts and builds up much of the theory of photon polarization states. This works very well in the opening pages, and Martin returns to it later in his discussion of electron spin and polarization theory. It provides a particularly clear idea of the representation of states and observables. Rae and Hameka introduce the more conventional wavefunction, letting the historical aspects emerge only later (introducing spinor representations (for electron spin) and a well-worn route, and too much to recommend it.

Models for hadron production are described briefly. Only the quantum chromodynamics results for total cross-section and for gluon jet production are given in much detail, the latter being presented in such compact form that it is doubtful if it would be fully appreciated without reference to original papers. My concern also applies to the chapter on fundamental interactions, in which the standard model of gauge interactions is presented, including renormalization effects, in a few pages. This is fine as a reminder and for establishing notation, but it is certainly too terse to offer a good introduction.

I am surprised that Martin did not decide to discuss angular momentum in terms of operator algebra, as much can be lost by introducing it by way of spherical harmonics. The same remark applies to his treatment of the other basic problem, the solution of the Coulomb potential. At least Hameka unifies these problems with his account of hypergeometric functions, but why does not one give a factorization solution of the hydrogen atom, such as Martin provides for the harmonic oscillator and Hameka begins for angular momentum? None of the authors rises to the challenge of presenting angular momentum in its crispest fashion, by way of commutation algebra. Hameka comes closest; but even he has to cobble together an unconvincing explanation of why spin-half systems may occur.

All three authors deal with approximation methods, but the strong grip on the material Martin shows in the rest of his book is loosened here. The examples he chooses, though interesting, seem too involved. Rae is particularly good on one aspect of perturbation theory, in his elementary discussion of scattering. Hameka presents a helpful account of perturbation theory and goes beyond the others in presenting Brillouin-Wigner theory and Green's functions techniques. His time-dependent perturbation theory (a simplification of a Heitler's treatment) is, however, too involved.

Hameka has an imprecise attitude to the uncertainty principle which leads him to state that "q and p cannot be measured with arbitrary

accuracy". Rae is particularly helpful in this aspect of the subject, but simultaneously lays himself open to major criticism by virtue of his lucidity. In the first place he presents the energy-time uncertainty relation as a consequence of an energy, time commutator, which is misleading. Nevertheless he does present a very lucid account of the quantum theory of measurement in his final chapter. Here he comes close to the truth in a single throw-away remark in which he suggests that a proper understanding of quantum mechanics would regard the simultaneous specification of complementary observations as absurd.

What attitudes to quantum mechanics will these three books instil? By avoiding questions of interpretation, Hameka will leave the impression that it is an intricate subject where calculations are guided by algebra and not insight. Martin will leave the impression that it is in principle business-like but intricate in practice. Although he does raise questions of interpretation, he only favours one approach in an already contentious field. Rae, in acknowledging that there is room for interplay between intuition and calculation, presents alternative interpretations, and allows the reader to come to his own conclusions.

P. W. Atkins

P. W. Atkins is lecturer in physical chemistry at the University of Oxford, and a fellow of Lincoln College, Oxford.

Colliding beams

Basics of Electron-Positron Collisions
by Fernand M. Renard
Editions Frontières, 150 FF
ISBN 2 86332 010 6

During the past decade, and particularly since the study of charmonium spectroscopy in the mid-1970s, the virtues of electron-positron colliding beams in making fundamental discoveries in particle physics has been widely recognized.

As electron-positron results have consequently been the highlights of many recent international conferences, there is no lack of excellent reviews from those conferences or of summer school lectures. The aim of this book is not to add to this list, but rather to provide an introduction to the subject for graduate physicists at the end of their first year.

Although the stated aim of Editions Frontières is to provide a pedagogical introduction accessible to a reader with an ordinary background in quantum mechanics and electromagnetism, Renard does not quite achieve this. As he asserts, a knowledge of relativistic quantum mechanics is required. Indeed to understand all the material discussed would require a knowledge of, say, the first and several chapters of the second volume of Bjorken and Drell's book.

The basic cross-sections for annihilation into two particles are developed in detail from first principles for all the cases of immediate interest: scalar, spin-half, and vector particles. These are calculated using both tensorial and helicity amplitude formalisms, the latter being carefully developed using the conventions of Jacob and Wick which may not be familiar to many readers. The consequences of beam polarization, a useful feature, are presented very explicitly.

A useful chapter discusses radiative corrections. These are often regarded as too detailed for public discussion, but it is vital to treat them carefully as inadequate treatments can even lead to the "discovery" of spurious effects such as apparent new particles. Although a few graphs may have illustrated the effects better than the rather opaque formulae, this is a useful chapter. It also includes the very recently treated effects of higher-order corrections on W and Z masses. However, before launching into radiative corrections in practice, it would be well to consult the experts such as Berends.

The general nature of the formulae and the many similar processes discussed sequentially make for rather tedious reading and thus preclude recommendation as a graduate text. A shorter, but more discursive text, with the details relegated to appendices, would have suited the purpose better. Nevertheless, the book's detailed derivations should ensure its use as a reference work in libraries. As such, the few errors should be detected by anyone working carefully through the derivations.

David G. Sutherland is lecturer in natural philosophy at the University of Glasgow.

David G. Sutherland is lecturer in natural philosophy at the University of Glasgow.

A fourth edition of P.A.M. Dirac's classic reference work *The Principles of Quantum Mechanics* has been published by Oxford University Press in paperback only at £7.95. Originally published in 1930, the book has been improved in a number of respects, particularly the complete re-writing of the chapter on quantum electrodynamics to take into account electron-positron creation, making it a suitable introduction to recent works on quantum field theories. A second edition of J. M. Cassida's first-year undergraduate textbook on *Basic Quantum Mechanics* has also been published by Macmillan at £22 and £9.95. Out of print for some time, a number of revisions have now been made to clarify and update the text.

Oxford University Press

Nuclear Magnetism

Order and Disorder
A. Abragam and M. Goldman

This book is a study in depth of the most interesting advances of the last ten to fifteen years in nuclear magnetism. It includes the study of new or improved methods, such as coherent manipulation of nuclear spins and high resolution resonances in solids, dynamic nuclear polarization at low temperatures, or pseudomagnetic neutron precession within polarized nuclear targets, but also nuclear spin systems of particular interest such as solid He-3, superfluid He-3, dipolar ferromagnets, and anti-ferromagnets. £45 International Series of Monographs in Physics

Quantum Gravity 2

A Second Oxford Symposium
Edited by C. J. Isham, R. Penrose and D. W. Sciama

The union of quantum theory with Einstein's general theory of relativity remains one of the major unattained goals of present-day theoretical physics. This volume reviews and analyses the developments that have occurred since the publication of the first symposium in 1975. £28

Quantum Processes in Semiconductors

B. K. Ridley

This book is written primarily for the postgraduate student and the experimentalist. It attempts to set out the theory of those basic quantum-mechanical processes in homogeneous semiconductors which are most relevant to applied semiconductor physics. Only basic quantum mechanics is discussed; no attempt is made to follow detailed applications of the basic theory. The theoretical level is at elementary first and second-order perturbation theory. £28

The Principles of Quantum Mechanics

P. A. M. Dirac

The first edition of this work appeared in 1930, and its originality won it immediate recognition as a classic of modern physical theory. The fourth edition has met a continued demand since its publication in 1958, and it is now made available in paperback for the first time. It is the standard work on the fundamental principles of quantum mechanics, indispensable both to the advanced student and the mature research worker, who will always find it a fresh source of knowledge and stimulation. *Nature*. Fourth edition paperback £7.95 International Series of Monographs in Physics

For more information about Oxford Science Publications please write to: Peter Naylor, Oxford University Press, Walton Street, Oxford OX2 6AR.

Gauge Theories in Particle Physics

J. R. Aitchison & A. J. G. Hey

A new, intuitive approach to the ideas and methods of gauge field theories in elementary particle physics, presenting the advanced theoretical topics at a level which is accessible to experimental physicists and new graduate students, and concentrating on the need of experimentalists for a lower-level approach than in previous publications. 1982 xiv + 332pp 0-85274-634-6 £14.50

Deep Levels in Semiconductors

M. Jaroš

An authoritative survey of the physics of deep levels in semiconductor materials and their influence on the functioning of semiconductor devices. It summarises recent research efforts and provides both a conceptual framework and a clear prescription for dealing with problems concerning the theory, modelling, detection and identification of deep levels. May 1982 xi + 302pp 0-85274-616-8 £24.00

Instrument Science and Technology

Volume 1

B. E. Jones (ed)

The first volume of an important new series on measurement and instrumentation. The 13 chapters cover noise and measurement, mathematical modelling, parameter estimation methods, dynamics, systematic design, feedback, reliability and ergonomics. The book will be useful to all instrument designers and metrologists, and to those teaching the subject. 1982 x + 144pp 0-85274-438-2 £6.95

Magnetic Garnets

G. Winkler

Magnetic garnets have recently assumed technological importance in magnetic bubble store application. This book aims to clarify the many intricacies of this diverse subject, both coherently and comprehensively, and to stimulate interdisciplinary understanding and cooperation between workers in the various fields involved. 1981 xv + 736pp 3-528-8487-1 £27.00

Adam Hilger Ltd.

Techno House, Redcliffe Way
Bristol BS1 6NX



BOOKS

MATHEMATICS AND PHYSICS

Gauge principle

Gauge Theories in Particle Physics: a practical introduction by Ian J. R. Aitchison and Anthony J. G. Hey...

Physicists studying the so-called elementary particles have, at present, a fairly simple basic picture. There are several different types of leptons and several different types of quarks...

Unfortunately, the mathematical machinery of quantum field theory, which is required in order to implement these physical ideas, is a very cumbersome one.

The aim of the authors of this book is to cut away as much formalism as possible, and to explain how to get from physical principles to practical calculations by the shortest possible route.

Calculus: pure and applied

A. J. Szteklak, E. M. Rosbuck and M. G. Godfrey

This text develops the ideas of calculus logically, explaining the principles and demonstrating them to be physically plausible. It is supplemented by extensive sets of exercises and examination questions with answers provided.

Numerical Analysis

W. A. Watson, T. Philipson and P. J. Oates

A sound elementary introduction to some of the most important methods of obtaining approximate numerical solutions of known accuracy to a wide variety of problems, with the aid of a calculator.

Principles of Electronic Instrumentation

A. de Sa

It contains much material which a modern physicist might be expected to be familiar with, particularly like the chapter on logic design and digital circuitry.

Elementary General Relativity

C. Clarke

A welcome addition to the literature because it introduces the modern coordinate-free notation of differential geometry in what is essentially an elementary text.

liantly. Great care and thought has been expended to help the reader understand his difficulties, both with physical understanding and with small but essential points in calculation. The reader is aided by such devices as problems, with careful hints, and appendices summarizing essential preliminaries.

Anyone with a general interest in physics will particularly enjoy the chapter called "Hidden gauge invariance", which explains how ideas from the theory of superconductivity played a key role in the development of modern elementary particle physics.

This book should be accessible to anyone with a good first degree in physics or mathematics. It is a delight to read, and can be recommended equally to theorists and experimenters.

J. C. Taylor

J. C. Taylor is a professor in the department of applied mathematics and theoretical physics, at the University of Cambridge.

Spatial concepts

Much Ado about Nothing: theories of space and vacuum from the Middle Ages to the scientific revolution by Edward Grant

Cambridge University Press, £30.00 ISBN 0 521 22983 9

Eschewing the more trendy approaches to history of science, Professor Grant has succeeded in producing a major revisionary work in the field, and one which will force others to rethink some of the basic premises upon which our interpretation of medieval and early modern history of philosophy and science is based.

Introductory Mechanics

C. D. Collinson

A student who used the book seriously would acquire a good grounding in mechanics and excellent practice in mathematics.

Ordinary Differential Equations

M. Rama Mohana Rao

A basic text which skillfully bridges the gap between the theory and applications of ordinary differential equations. The emphasis is on the interaction between theoretical and practical aspects.

FORTAN 77

Donald M. Moore

FORTAN is one of the most popular and widely-used computer languages, and this highly-structured text provides an introduction to the most recent standard version of the language.



Edward Arnold, 41 Bedford Square, London WC1B 3DQ

For a long time, it has been recognized that Isaac Newton's views on space and time marked a break with the past and provided one of the foundations for classical physics which held sway until Einstein. According to the received view, the Newtonian conception of space and time was derived from a fusion of neoplatonic, atomistic and empirical elements. In reworking this material and by bringing to bear a wider range of sources than any previous scholar, Grant demonstrates two other significant factors in the story. He shows quite convincingly that elements must also be taken into account. The stoic contribution - the interpenetrability of bodies and an extraneous void space - is known, but here for the first time this "underprivileged" source is given its due as a force to be reckoned with in early modern thinkers, and not only as it relates to ethical and political issues.

Grant shows that even a rabid neoplatonist like Francesco Patrizi fused a good deal of stoic doctrine into his synthesis. This goes hand in hand with some of the recent work of the Newtonian scholar J. E. McGuire to force us into a full re-evaluation of stoic sources for early modern scientific thought.

Newton, the formulator of the classical view, saw a finite universe surrounded by infinite space, which is essentially stoic rather than Aristotelian, Platonic or atomistic.

Even more surprising is the way in which Grant can demonstrate a link between the modern space concept and the intricate formulations of many generations of scholastic philosophers and theologians, stretching from the thirteenth to the seventeenth century.

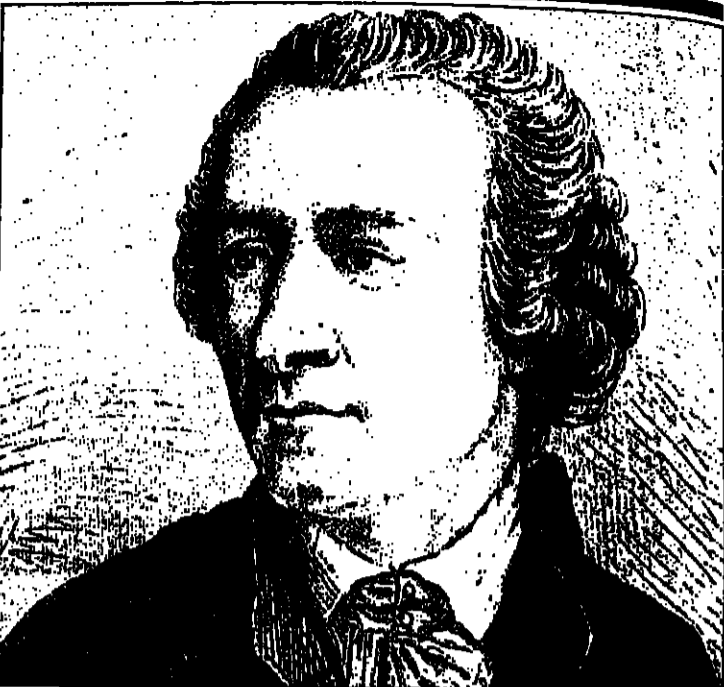
What is good about this book is that it introduces a new cast of characters into the story. Philoponus, Bradwardine, Major, Patrizi and Gassendi are given due emphasis, perhaps for the first time in such a study. Science and philosophy do not progress merely from one famous name to another.

What emerges from this case study is the fact that the "decadent" era of scholasticism was not equally feeble-minded in all particulars. For too long historians have equated the Renaissance tradition of Aristotelianism with the evident failure to evaluate Aristotle.

What is evident from this view and a few other studies is that the schoolmen of the Renaissance still had intellectual vigour. More importantly, they did not form a coherent phalanx of intransigence, but went off in many divergent directions, some scarcely recognizable to orthodox Aristotelians.

I am enthusiastic about this book: it covers a complex and important problem over a wide geographical and chronological range; its interdisciplinary scholarship is insight and superb; the text is well written and exciting to read; while the apparatus is scholarly enough for the most fastidious, it should spur many readers to engage in much future discussion and research.

On the other hand, it is not above criticism. Why, for instance, is nothing made of the fundamental importance of the vacuum experiments of the 1640s and 1650s? Von Guericke and Pascal are discussed as if true, but only for their theories of space, not for their experiments. Torricelli and Boyle do not even appear in the index. The bibliography is simple and



Leonhard Euler (1707-83)

useful, but Lasswitz's fundamental *Geschichte der Atomistik* is never mentioned. An excellent chance to show how Aristotelians were at the centre of some of the most important developments is lost by not giving a fuller role to E. Maignan, who was an important participant in the vacuum experiments in Rome during the 1640s.

I am also convinced that a rather major shift is involved when philosophers and scientists stopped speaking of the Aristotelian place (locus) and moved towards the Newtonian formulation of space (spatium).

There is more than just an idle terminological change at stake here; the metaphysical and physical connotations of the two words were radically different. However, we are told nothing of this. Finally, it is a pity that the author could not have seen Brian Copenhaver's recent article on Jewish theologians of space in the scientific revolution, which clearly shows a significant Hebrew component in the story through the term *maqom* (place) used by both Henry More and Newton.

What is good about this book is that it introduces a new cast of characters into the story. Philoponus, Bradwardine, Major, Patrizi and Gassendi are given due emphasis, perhaps for the first time in such a study. Science and philosophy do not progress merely from one famous name to another.

What emerges from this case study is the fact that the "decadent" era of scholasticism was not equally feeble-minded in all particulars. For too long historians have equated the Renaissance tradition of Aristotelianism with the evident failure to evaluate Aristotle.

What is evident from this view and a few other studies is that the schoolmen of the Renaissance still had intellectual vigour. More importantly, they did not form a coherent phalanx of intransigence, but went off in many divergent directions, some scarcely recognizable to orthodox Aristotelians.

I am enthusiastic about this book: it covers a complex and important problem over a wide geographical and chronological range; its interdisciplinary scholarship is insight and superb; the text is well written and exciting to read; while the apparatus is scholarly enough for the most fastidious, it should spur many readers to engage in much future discussion and research.

On the other hand, it is not above criticism. Why, for instance, is nothing made of the fundamental importance of the vacuum experiments of the 1640s and 1650s? Von Guericke and Pascal are discussed as if true, but only for their theories of space, not for their experiments. Torricelli and Boyle do not even appear in the index. The bibliography is simple and

Degrees of freedom

The Evolution of Dynamics: vibration theory 1687 to 1742 by John T. Cannon and Sigalla Dostrovsky

Springer, DM98.00 ISBN 3 540 90626 6

As the history of mathematics at last develops into a thriving discipline, one must expect a more and more meticulous division of labour into periods; so it should be said at once that there is nothing arbitrary about the particular division covered by this book.

It takes as its starting-point Treussell's very important (but as yet formerly neglected) emphasis on the very slow emergence of the character here is, of course, Euler; and he is in this period. But it is Euler with a difference, for it is his earlier work which is neglected because he himself later reworked it into a form more familiar to modern eyes.

There is a great difference between mechanics with one degree of freedom (in which Newton is the acknowledged master) and that with

more (or many) degrees of freedom. It is not merely the technical increase in complexity; conservation of energy is sufficient to solve a problem with one degree of freedom, but not for others. And, more subtly, the techniques of the early eighteenth century involved only a sparing use of the function notation, a notation which is easily dispensable in one degree of freedom. (This distinction is not to neglect celestial mechanics; but there special symmetries allowed essentially one degree of freedom methods to be used.)

Yet there was a respectable corpus of dynamics in many degrees of freedom before the middle of the eighteenth century: vibration theory. It would be anachronistic to see this as the result of these problems being linear and solvable; for they are not only in the complete dynamical theory which did not exist at the time. This is the reason that these problems which were considered were not, mostly, those with two or three degrees of freedom, but those with an infinite number.

The story begins with Newton's analysis of the propagating pressure wave in the first edition of the *Principia*. Although this was the start of dynamics with many degrees of freedom, it was largely misunderstood (even by Cores in editing the second edition) and these misunderstandings affected the later developments of the subject. Next come chapters on work on the vibrating string carried out by Taylor and Sauveur. Hermann's attempt on the pressure wave and on the vibrating string does not argue much understanding of Newton or Taylor and much the same can be said of Cramer in 1732. But five years later Euler is able to make substantial progress on an apparently trivial, though still without a clear understanding of sound.

In 1728 Johann Bernoulli considered the vibrating string and compared it with the corresponding problem of a light string with equal point masses distributed along it. This technique was then applied to both Daniel Bernoulli and Euler to the hanging chain (or the linked pendulum). This work brings in Bessel functions and Laguerre polynomials, and the zeros of these functions were found with fair accuracy. As well as a detailed discussion of these papers, the book contains in an appendix a facsimile of Bernoulli's papers on 1735 to consider the transverse vibrations of a rod with one end clamped.

Later chapters deal with Johann Bernoulli II on light, Daniel Bernoulli on floating bodies and on a rigid body hanging from a string, as well as other attempts to resolve these problems.

This book is a definitive and detailed addition to our knowledge of the history of mechanics, although in its specialized interests it does sometimes seem as if these developments were taking place in a mathematical vacuum unrelated to other developments.

C. W. Kilmister

C. W. Kilmister is professor of mathematics at King's College, London.

BOOKS

MATHEMATICS AND PHYSICS

Tracking cosmic intruders

High-Energy Astrophysics: an informal introduction for students of physics and astronomy by M. S. Longair

Cambridge University Press, £24.00 and £R.95 ISBN 0 521 23513 8 and 28013 3

Biography and geography, we are told, are about chaps and maps. Allusive, but false. It would be a poor geographer who thought Greenland and Australia, besides being large islands, had much else in common. The idea, however, that astronomy is about stars dies hard, as a glance at the syllabus for astronomy at O level will show. Stars are so conspicuous and immutable that it seems they must be the very stuff of the Universe.

Four hundred years after Copernicus the second astronomical revolution has occurred. Advances in rocky-dry and observational methods have revealed a panorama quite different from the distorted and myopic view through an all but opaque atmosphere and in this panorama the stars are of only middling significance.

Our galaxy, it seems, is composed mainly of tenuous gas, tiny dust grains and tortuous magnetic fields; these are its permanent inhabitants. Intermittently, for unknown reasons, the gas and dust form clouds which contract and condense under their own gravitational forces.

Stars are born, live and die. transient objects of little importance save in one respect, that the chemical elements that make life possible are manufactured in these stars and expelled in their death throes. Our galaxy is a rather insignificant one, emitting only a tiny fraction of the enormous radio power, far exceeding their starlight, that many others send out. Between these galaxies, pervading all space, pass and re-pass the cold photons which heat big bang. Astrophysics is the study of the nature, interaction and evolution of these components of the Universe: gas, dust, magnetic fields, radiation - and stars.

Perhaps the biggest surprise of this second revolution has been the realization of how lively the Universe is. The swiftness and complexity of many processes are astounding. Relativistic motions, shock waves, complex motions and implosions are the norm rather than the exception. Since our sun, a main sequence star, represents matter in an unusual stage of quiescence, we happen to be rather remote from such cataclysmic events; news of them comes not only second-hand, via electromagnetic radiation, but also by eyewitness accounts. These messengers are the cosmic rays.

Cosmic rays are another of the major constituents of the Universe, interacting with the others on their voyage to us but at last suffering the same fate as all the rest except starlight and radio waves, namely degradation in the Earth's atmosphere. Comprising protons, heavier nuclei, and some electrons, they come from all directions. Although their intensity decreases logarithmically with increasing energy up to as high as ten to the power of twenty electron volts, the rate of fall-off may be different for the various particles, so that the most energetic are all but undetectable. Such energies are almost incomprehensible: imagine dropping a one kilogram ton weight from shoulder height on to your foot; the energy there deposited is a measure of what nature can somehow concentrate in just a single one of these cosmic rays. The power of twenty-five nucleons carries the energy of that weight. How does nature do it?

Where? These questions are the essence of high-energy astrophysics, the subject of Professor Longair's book, developed from a lecture course given at Cambridge before the author moved to Edinburgh as Astronomer Royal for Scotland.

As this is a transcription of lecture notes (including example sheets), not a formal textbook, a chatty, informal style is retained throughout. Though not easy to do well, Professor Longair has got the recipe just right. His audience are final-year physics students; his theme that cosmic rays are intruders which arrive at the Earth carrying a cryptic message, a record of their origin and journey, a record to decipher that message. The task the author adopts is to trace the journey out into space and back in time, establishing facts where he can and, when certainty founders, exposing the various options.

After a brief survey of the discovery of cosmic rays, the first step is to interrogate the intruders. Four lectures on the interaction of high-energy particles and photons with matter are followed by three lectures outlining the detectors and telescopes which this can be done. Ionization and bremsstrahlung radiation, are discussed in detail, as these introduce methods and derive results used later on. The results of the interrogation are then reviewed in two lectures on the properties of cosmic rays. As in all the best detective stories, the intruders are adept at covering their tracks, so we must patiently trace their progress through the magnetic maze of the solar system; and three lectures on the dynamics of charged particles in cosmic magnetic fields provide the groundwork.

In open space at last, the audience (physics students, remember) are told, so a brief map of the surroundings is provided; rather small scale, our galaxy is seen to be only a tiny part of the universe. Most readers will want to have seen at least a sketch of this region before. Next the pace quickens - where are the cosmic rays? Professor Longair reveals the evidence, from synchrotron radio emission, that energetic electrons permeate our galaxy, and also, from observations of gamma rays and elemental abundances, that protons and heavier nuclei are also present. But are they native to our galaxy, or immigrants? This is the heart of the matter. After a survey of possible extragalactic sources of cosmic rays, the question is put to you, the jury: Are cosmic rays of galactic or extragalactic origin? Whatever you decide (and Professor Longair gives judicious guidance) the enormous energies released, the enormous energies released, interaction and evolution of these components of the Universe: gas, dust, magnetic fields, radiation - and stars.

The reader should have a good background in classical electromagnetic theory, and special relativity. Other than this, only a nimble intelligence is needed to follow the arguments, which are rarely completely rigorous but instead appeal to physical intuition and order-of-magnitude calculations. Although this approach may not please some, it enables the author to expose the reader to most of the important

questions occupying astrophysics today. Naturally much of the material derives from other authors, and I particularly welcome the comprehensive yet succinct suggestions for further reading. The illustrative data are exceedingly well presented, being culled from up-to-date and thoughtfully selected from the wealth available.

The course was last given in 1977 and the updating has been selective, as the author admits. Observations from the Einstein X-ray satellite are discussed, as are recent ideas on the mechanisms powering extragalactic double radio sources. On the other hand, the treatment of meteoritic studies of cosmic ray exposure ages, for example, looks a little dated. Evidence for a massive galactic halo is also even stronger now, and this could have a significant effect on halo confinement models.

But these are minor points. For the reader wanting to see how physics is applied to a real research problem, and in so doing to find out about the main concerns of astrophysics today, this book can be highly recommended.

John Edgington

John Edgington is reader in experimental physics at Queen Mary College, London.

BOOKS

MATHEMATICS AND PHYSICS

Playing dice with Einstein

Quantum Fields in Curved Space by N. D. Birrell and P. C. W. Davies

Cambridge University Press, £27.50 ISBN 0 521 23385 2

The undergraduate who first encounters quantum mechanics is left with a perplexing image in his mind of one very confused electron approaching a screen in which there are two holes. After recovering from this shock, his first meeting with the theory of relativity leaves him to ponder the fate of twins who become degenerated by space travel.

Quantum mechanics and general relativity are the foundation stones of modern physics and upon them will be erected the theories of the future, theories that synthesize now independent aspects of elementary particles and gravitation. Both quantum theory and relativity introduced revolutionary views of Nature and have perennially provided the scientific writer with a steady supply of the paradoxical for popular consumption. But until recently these two theories have resisted all attempts at amalgamation. Einstein himself had little interest in such a specific synthesis because he simply did not believe quantum theory, and it was Schrödinger who seems to have been the first to consider the behaviour of quantum fields in spaces curved by gravity. In 1932, however, no quantum theory of the electromagnetic field existed and his investigations

were not followed up. To illustrate the difficulty involved when considering quantum aspects of general relativity at a very naive level we recall the hallmark of a quantum theory: the Heisenberg uncertainty principle, which quantifies the fact that we cannot know both the position and the momentum of a particle precisely because the process of measurement inevitably perturbs its configuration. Although Schrödinger's equation is a deterministic equation for the development of the wave function in space and time, this deterministic function is not observable.

Not to be outdone, the extraordinary feature of general relativity is its geometrical character. Other physical theories give us sets of rules for predicting how objects will move and interact once we put them down in some pre-specified space. General relativity is different: it tells us that it is unnecessary to specify the spacetime geometry in which the particles exist. Their mass and motion actually determine the fabric of the space in which they are placed, rather like the motion of ball-bearings would determine the topography of a rubber sheet on which they were rolled. The clash of quantum and relativistic ideas can now be seen. For if the position and motion of particles cannot be precisely known but yet are necessary to specify the space-time geometry in which they are moving then we must admit the entire fabric of space and time to be indeterminate, so we cannot introduce the particles - we are caught in a vicious circle.

As yet there has been no real progress into the problem of quantizing space-time. It probably remains the most difficult question to be answered by physicists of the future and will require a major extension of physics for its resolution. However, rapid progress is being made on the more limited problem first posed by Schrödinger in the 1930s: the behaviour of matter obeying the laws of quantum theory but moving in a non-quantum model of space and time. It is to this sub-department of quantum gravity that Birrell and Davies's book is devoted.

Pitched at a level appropriate for graduate students who are familiar with most of Weinberg's *Gravitation and Cosmology* and Bjorken and Drell's *Relativistic Quantum Fields*, the book is divided into nine chapters, each nicely self-contained. The first provides a brief review of quantum field theory in flat space-time before reviewing some of the new concepts encountered in curved space calculations. Included here are examples of particle creation from the quantum vacuum in the presence of gravitational fields. When virtual particle-antiparticle pairs appear in the vacuum, a strong gravitational field gradient ensures that each member of a pair will feel a slightly different force and they will be unable to re-annihilate. They become real pairs. The energy required to supply their rest mass is extracted from the gravitational field gradient. Chapter four describes example calculations using "toy" universes with only one spatial dimension and

accelerating mirrors. Using the intuition built up from these examples, particle creation is then discussed in a variety of model universes provided by the solutions to Einstein's field equations found by Friedmann, Einstein, Milne, de Sitter and Kantner. Chapters six and seven are much more technical and describe how the energy momentum tensor of the created particles can be renormalized.

Chapter eight describes the most spectacular application of the foregoing theory and the principal reason why the book has been written. In 1974 Stephen Hawking announced that a quantum mechanical treatment of black holes revealed that particles could tunnel out of the region which classically was completely inescapable. Furthermore, black holes are black bodies: an outside observer, far from the hole, who observed the consequences of this tunnelling would see particles radiated away from the hole with a black body spectrum whose temperature was solely determined by the mass of the black hole. Before 1974, several physicists had noticed that the rules governing the behaviour of non-quantum black holes bore an uncanny resemblance to the laws of thermodynamics. After Hawking's discovery this resemblance was seen to be more than mere analogy: quantum theory endowed black holes with real temperatures, entropies and thermodynamics.

The only area where I found the book a little disappointing was in the brevity of the treatment of the thermodynamic aspects of black holes. To the physicist not intimately involved in the details of quantum gravity, it must seem that there is something much more fundamental in the intrinsic thermodynamics of gravitational fields than in calculational stress tensors and that the thermodynamic aspect will be the surest guide to future progress.

This book is a clear and cogent introduction to a partially charted territory that has already proved remarkably fertile. The cultivation of new ideas should be greatly aided by providing graduate students with this coordinated textbook. Though not the last word on quantum fields in curved space, it provides the basic vocabulary upon which future discussions will be based.

NOW AVAILABLE IN PAPERBACK BIOLOGICAL ENERGY RESOURCES

Malcolm Slessor and Chris Lewis

This account begins with an introduction to the nature of solar energy and its role in photosynthesis and goes on to discuss the different technologies available for conversion of this energy into fuel. These methods include direct combustion to obtain heat, chemical treatments yielding solid, liquid and gaseous fuels, and microbiological processes leading to alcohol and methane production.

Paperback 0 418 12670 1 192 pages Illustrated £6.95

Chapman and Hall, 11 New Fetter Lane, London EC4P 4AE

BOOKS

MATHEMATICS AND PHYSICS

Tracking cosmic intruders

High-Energy Astrophysics: an informal introduction for students of physics and astronomy by M. S. Longair

Cambridge University Press, £24.00 and £R.95 ISBN 0 521 23513 8 and 28013 3

Biography and geography, we are told, are about chaps and maps. Allusive, but false. It would be a poor geographer who thought Greenland and Australia, besides being large islands, had much else in common. The idea, however, that astronomy is about stars dies hard, as a glance at the syllabus for astronomy at O level will show. Stars are so conspicuous and immutable that it seems they must be the very stuff of the Universe.

Four hundred years after Copernicus the second astronomical revolution has occurred. Advances in rocky-dry and observational methods have revealed a panorama quite different from the distorted and myopic view through an all but opaque atmosphere and in this panorama the stars are of only middling significance.

Our galaxy, it seems, is composed mainly of tenuous gas, tiny dust grains and tortuous magnetic fields; these are its permanent inhabitants. Intermittently, for unknown reasons, the gas and dust form clouds which contract and condense under their own gravitational forces.

Stars are born, live and die. transient objects of little importance save in one respect, that the chemical elements that make life possible are manufactured in these stars and expelled in their death throes. Our galaxy is a rather insignificant one, emitting only a tiny fraction of the enormous radio power, far exceeding their starlight, that many others send out. Between these galaxies, pervading all space, pass and re-pass the cold photons which heat big bang. Astrophysics is the study of the nature, interaction and evolution of these components of the Universe: gas, dust, magnetic fields, radiation - and stars.

Perhaps the biggest surprise of this second revolution has been the realization of how lively the Universe is. The swiftness and complexity of many processes are astounding. Relativistic motions, shock waves, complex motions and implosions are the norm rather than the exception. Since our sun, a main sequence star, represents matter in an unusual stage of quiescence, we happen to be rather remote from such cataclysmic events; news of them comes not only second-hand, via electromagnetic radiation, but also by eyewitness accounts. These messengers are the cosmic rays.

Cosmic rays are another of the major constituents of the Universe, interacting with the others on their voyage to us but at last suffering the same fate as all the rest except starlight and radio waves, namely degradation in the Earth's atmosphere. Comprising protons, heavier nuclei, and some electrons, they come from all directions. Although their intensity decreases logarithmically with increasing energy up to as high as ten to the power of twenty electron volts, the rate of fall-off may be different for the various particles, so that the most energetic are all but undetectable. Such energies are almost incomprehensible: imagine dropping a one kilogram ton weight from shoulder height on to your foot; the energy there deposited is a measure of what nature can somehow concentrate in just a single one of these cosmic rays. The power of twenty-five nucleons carries the energy of that weight. How does nature do it?

Where? These questions are the essence of high-energy astrophysics, the subject of Professor Longair's book, developed from a lecture course given at Cambridge before the author moved to Edinburgh as Astronomer Royal for Scotland.

As this is a transcription of lecture notes (including example sheets), not a formal textbook, a chatty, informal style is retained throughout. Though not easy to do well, Professor Longair has got the recipe just right. His audience are final-year physics students; his theme that cosmic rays are intruders which arrive at the Earth carrying a cryptic message, a record of their origin and journey, a record to decipher that message. The task the author adopts is to trace the journey out into space and back in time, establishing facts where he can and, when certainty founders, exposing the various options.

After a brief survey of the discovery of cosmic rays, the first step is to interrogate the intruders. Four lectures on the interaction of high-energy particles and photons with matter are followed by three lectures outlining the detectors and telescopes which this can be done. Ionization and bremsstrahlung radiation, are discussed in detail, as these introduce methods and derive results used later on. The results of the interrogation are then reviewed in two lectures on the properties of cosmic rays. As in all the best detective stories, the intruders are adept at covering their tracks, so we must patiently trace their progress through the magnetic maze of the solar system; and three lectures on the dynamics of charged particles in cosmic magnetic fields provide the groundwork.

In open space at last, the audience (physics students, remember) are told, so a brief map of the surroundings is provided; rather small scale, our galaxy is seen to be only a tiny part of the universe. Most readers will want to have seen at least a sketch of this region before. Next the pace quickens - where are the cosmic rays? Professor Longair reveals the evidence, from synchrotron radio emission, that energetic electrons permeate our galaxy, and also, from observations of gamma rays and elemental abundances, that protons and heavier nuclei are also present. But are they native to our galaxy, or immigrants? This is the heart of the matter. After a survey of possible extragalactic sources of cosmic rays, the question is put to you, the jury: Are cosmic rays of galactic or extragalactic origin? Whatever you decide (and Professor Longair gives judicious guidance) the enormous energies released, the enormous energies released, interaction and evolution of these components of the Universe: gas, dust, magnetic fields, radiation - and stars.

Third Edition ELEMENTARY STATISTICAL METHODS

G. Barrie Wetherill, Professor of Statistics, University of Kent at Canterbury

This book provides a comprehensive introductory text on statistical methods. The mathematical level of the book is fairly low, but a very careful discussion of fundamental logical principles is given. There are many exercises and examples to illustrate the text, including some problems involving more difficult mathematics. This third edition contains a completely revised appendix on calculation and computing which includes some simple programs in BASIC. It will be welcomed by students taking courses in statistics.

Paperback 0 412 24000 8 368 pages £6.95

Chapman and Hall, 11 New Fetter Lane, London EC4P 4AE

BOOKS

MATHEMATICS AND PHYSICS

Playing dice with Einstein

Quantum Fields in Curved Space by N. D. Birrell and P. C. W. Davies

Cambridge University Press, £27.50 ISBN 0 521 23385 2

The undergraduate who first encounters quantum mechanics is left with a perplexing image in his mind of one very confused electron approaching a screen in which there are two holes. After recovering from this shock, his first meeting with the theory of relativity leaves him to ponder the fate of twins who become degenerated by space travel.

Quantum mechanics and general relativity are the foundation stones of modern physics and upon them will be erected the theories of the future, theories that synthesize now independent aspects of elementary particles and gravitation. Both quantum theory and relativity introduced revolutionary views of Nature and have perennially provided the scientific writer with a steady supply of the paradoxical for popular consumption. But until recently these two theories have resisted all attempts at amalgamation. Einstein himself had little interest in such a specific synthesis because he simply did not believe quantum theory, and it was Schrödinger who seems to have been the first to consider the behaviour of quantum fields in spaces curved by gravity. In 1932, however, no quantum theory of the electromagnetic field existed and his investigations

were not followed up. To illustrate the difficulty involved when considering quantum aspects of general relativity at a very naive level we recall the hallmark of a quantum theory: the Heisenberg uncertainty principle, which quantifies the fact that we cannot know both the position and the momentum of a particle precisely because the process of measurement inevitably perturbs its configuration. Although Schrödinger's equation is a deterministic equation for the development of the wave function in space and time, this deterministic function is not observable.

Not to be outdone, the extraordinary feature of general relativity is its geometrical character. Other physical theories give us sets of rules for predicting how objects will move and interact once we put them down in some pre-specified space. General relativity is different: it tells us that it is unnecessary to specify the spacetime geometry in which the particles exist. Their mass and motion actually determine the fabric of the space in which they are placed, rather like the motion of ball-bearings would determine the topography of a rubber sheet on which they were rolled. The clash of quantum and relativistic ideas can now be seen. For if the position and motion of particles cannot be precisely known but yet are necessary to specify the space-time geometry in which they are moving then

Wiley CHICHESTER · NEW YORK · BRISBANE · TORONTO · SINGAPORE

GALACTIC X-RAY SOURCES
 Edited by P.W. Sanford, Department of Physics and Astronomy, University College, London, Mullard Space Science Laboratory; P. Laskarides, Department of Astronomy, University of Athens, and J. Salton, Department of Physics and Astronomy, University College, London, Mullard Space Science Laboratory
 A comprehensive introduction to galactic x-ray sources (this assumes little previous knowledge of the subject, which is now seen as an integral part of modern astronomy. It is based upon the material presented at an Advanced Study Institute, which was sponsored by NATO, was held at Cape Sounion in Greece and was an attempt to exchange ideas and form bridges between specialists and young astronomers.
 0471 27963 approx. 468pp May '82 approx. \$54.85/£22.50

AN INTRODUCTION TO TENSOR CALCULUS, RELATIVITY AND COSMOLOGY 3rd Ed.
 by D.F. Lawden, Department of Mathematics, The University of Aston in Birmingham
 Previous editions of this elementary introduction to tensor calculus and relativity have established themselves as standard texts at universities in Europe and America. From his personal teaching experience the author has identified those parts of the subject which students find most difficult, and in this third edition pays special attention to clarity and precision of language to resolve them.
 0471 10082 X approx. 208pp June '82 cloth approx. \$35.40/£14.75
 0471 10096 X approx. 208pp June '82 paper approx. \$19.10/£7.95

FUNCTIONAL ANALYSIS
 by Harro G. Heuser, University of Karlsruhe, Federal Republic of Germany
 Translated by John Horvath, University of Maryland
 Contains the basic concepts, the essential statements and the main methods of functional analysis. The book emphasizes the link between the abstract theory and practical applications (there are nearly 500 exercises) and includes an extensive bibliography.
 0471 28052 6 424pp February '82 cloth \$58.75/£25.00
 0471 10069 2 424pp February '82 paper \$23.40/£9.95

SEVENTEEN SIMPLE LECTURES ON GENERAL RELATIVITY THEORY
 by H.A. Buchdahl, Australian National University
 0471 09684 9 190pp December '81 \$31.85/£17.75
 Please write to the Textbook Manager for further information — inspection copies of certain titles available.

John Wiley & Sons Limited
 Baffins Lane · Chichester · Sussex PO19 1UD · England

Wadsworth International Group Announces:

THE MATHEMATICAL GARDNER,
 edited by David Klarnen.
 "A stellar cast of Martin Gardner fans offer a 65th birthday collage of games, geometry, packings and tiling, supernatural numbers, codes, fun, and games. A wonderful tribute to mathematics' greatest popularizer." (American Mathematical Monthly)
 1981 382 pp. cloth £17.60 ISBN 0-534-98015-5

AN INTRODUCTION TO CLASSICAL REAL ANALYSIS by Karl Stromberg.
 Contents: Numbers; Sequences and Series; Limits and Continuity; Differentiation; Transcendental Functions; Integration; Infinite Series/Infinite Products; Trigonometric Series. "A wonderful text... This could very well become a classic." (American Mathematical Monthly) "This book will become a standard reference." (Choice)
 1981 562 pp. cloth £21.85 ISBN 0-534-98018-0

GRAPHS AND DIGRAPHS by M. Behzad, G. Chartrand, and L. Lesniak-Foster.
 "This well-written book is intended as an introduction to the theory of graphs." (Mathematical Reviews)
 1979 406 pp. cloth £20.40 ISBN 0-534-98021-X

ELEMENTARY MATHEMATICAL ANALYSIS, SECOND EDITION, by Colin Clark.
 This text provides a rigorous foundation for students familiar with the techniques of calculus.
 1982 260 pp. cloth £14.55 ISBN 0-534-98918-X

INTRODUCTION TO MATHEMATICAL LOGIC, SECOND EDITION, by Elliott Mendelson.
 For senior undergraduate and postgraduate students.
 1979 328 pp. cloth £18.40 ISBN 0-534-25307-5

INTRODUCTION TO LOGIC by Patrick Suppes.
 A classic undergraduate introduction.
 1957 312 pp. cloth £14.55 ISBN 0-534-08072-3

Order from: Wadsworth International Group
 Box T381
 52 Bloombury St.
 London, England WC1B 3QT

BOOKS
 MATHEMATICS AND PHYSICS

Model equations

Modelling with Differential Equations
 by D. N. Burghes and M. S. Borrie
 Ellis Horwood: Wiley, £12.50 and £4.90
 ISBN 0 85312 386 5 and 296 2
 Ordinary Differential Equations: theory and applications
 by M. Rama Mohana Rao
 Edward Arnold, £9.50
 ISBN 0 7131 3452 6

The study of differential equations as a mathematical discipline has always enjoyed a privileged position in mathematics and its diverse fields of applications. In one respect the theory of differential equations has provided a continuing stimulus to the advance of mathematical analysis. In another, it provides a basic tool for modelling phenomena in physics and engineering; and more recently differential equation models have been making an increasing contribution to the biological and social sciences. Burghes and Borrie's book endeavours to introduce this modelling aspect, whereas Rao's book attempts to bridge the gap between applications and the theory itself. Burghes and Borrie make a valiant attempt to illustrate the power of differential equations through modelling a very wide variety of applications ranging from detecting the age of the round table in Winchester Castle and modelling artificial kidney machines, to the dynamics of the arms race. At times the authors are successful, though at others their arguments are much less convincing. For example, why in the discussion of population models on page 15 is one asked to let the small time interval tend to zero? As no explanation is given, it may be that this has been done purely to arrive at a differential equation, a possibility which occurred to me frequently as I read the book. In areas where the underlying concepts such as Newton's inverse square law and Kirchhoff's laws are well established, the modelling is much more convincing. Although this is not a direct criticism of the authors' efforts, it nevertheless reflects that, in the biological sciences, few basic principles are available on which a model can be formulated. Indeed, one is forced into the position of adding to the mathematical formulation the choice of mathematical tool to use, whether it be differential equations, difference equations or simulation, among others. This enjoyable book could form a suitable introduction to differential equation models at first-year university or college level. One note of caution: there are many instances where concepts are not adequately explained (for example, the concept of a "general solution" of a differential equation is not really defined). Also, the example on page 23 of a differential equation having no solution is misleading. The book by Rao is a more advanced text dealing with a careful introduction to basic concepts, such as order, of linear or nonlinear differential equations, together with precise definitions of solutions. The author makes full use of the functional analytic concepts so important for understanding current developments in the subject. Necessary concepts are set out in the opening chapters, which then discuss existence and uniqueness of solutions, the continuation of solutions, and Schauder's fixed-point theorem. Chapter two provides an account of homogeneous and inhomogeneous linear systems and their asymptotic behaviour. A discussion of Liapunov stability for linear and nonlinear autonomous systems then follows in chapter three, in which the Poincaré phase plane is also covered. Chapter four, on second-order differential equations, includes discussions of the Sturm comparison

theorems, the Prüfer transformation, and of the Liénard, the Van-der-Pol, and the Cartwright-Littlewood equations. A final chapter deals with the development of Liapunov's second method for examining the stability of autonomous systems. It is difficult to strike a good balance in trying to convey modern developments in the theory of differential equations and their applications. However, it would have been useful if the author had included a chapter on boundary and particularly eigenvalue problems. Although Rao develops a number of modern aspects, he does not really succeed in providing the bridge between applied and theoretical aspects of the subject intimated in his preface. Overall, I can recommend the book to advanced undergraduate or beginning postgraduate students of mathematics. Engineers and physicists may find it hard going but well worth the effort. The numerous examples range from the simple verification of ideas and techniques to those demanding a good understanding of the material.

Functional analysis

Applied Functional Analysis
 by D. H. Griffel
 Ellis Horwood: Wiley, £25.00 and £8.50
 ISBN 0 85312 226 1 and 304 7

As many books exist with roughly the same aims as this one, it is important to identify distinctive features before considering details. Here, "applied functional analysis" means techniques for studying the existence, uniqueness, and approximate solution of linear and nonlinear operator equations, mainly, partial differential equations of practical interest. Consequently, only those theorems essential to this schema are included. The book is intended for undergraduates in mathematics, mathematical physics, and engineering. Although little is assumed, and the treatment is deliberately introductory, only students with the elusive "mathematical maturity" will be able to appreciate the significance of the theorems. Within these limitations, the author demonstrates that several apparently abstract results have fairly direct applications to concrete problems, including some in which, before functional analysis was used, conflicting predictions had been made. References are used frequently to defer delicate or advanced arguments to further reading, without seriously detracting from the continuity of the text. However, the scope remains somewhat narrow: applications in game theory, econometrics, approximation theory and quantum mechanics, for instance, could have been given with comparatively little increase in the abstract material. None of the "classic" theorems (Hahn-Banach, open mapping, closed graph) is mentioned. And a survey, however brief, indicating other uses and uses of functional analysis (with references) would have improved the presentation. The discussion opens with elementary properties of distributions and Green's functions, and those of "regular", "weak", "distributional" and "fundamental" solutions of differential equations, with routine applications. Next comes a brief account of Fourier transforms of distributions, and of Green's functions for the Laplace and wave equations. This material (part one) is useful in subsequent applications, but of little functional analytic content. The techniques developed in part two refer to Banach spaces and nonlinear equations; the Banach and Schauder fixed-point theorems are used in various existence/uniqueness proofs for nonlinear equations, the Arzelà-Ascoli criterion being used to establish relative compactness. The most interesting application is to "swinging flow". Part three discusses linear equations in a Hilbert space framework, the primary objective being to establish the spectral theorem for compact, self-adjoint operators, with applications to construction of Green's functions, to eigenvalue expansion, and (after "positive operators" have been introduced) to variational approximation methods for linear equations, convergence being proved by fixed-point arguments. Several examples are given, and the "Rayleigh-quotient" and "Rayleigh-Ritz method" are examined carefully. Applications include the calculation of the reflection coefficient for waves at a barrier, and the determination of torsional stiffness. "Positive operators", which enable some estimates of eigenvalues for linear operators to be made, and the "Fredholm alternative" for linear equations is also established. Finally, part four discusses a few advanced topics, without proofs, to give the flavour of recent research, with indications of the use of Fréchet derivatives in stability and bifurcation problems, and of Sobolev spaces in boundary value problems. Due attention is given to distinguishing among "definitions", "remarks", "examples", "lemmas", "theorems" and "propositions". This is not pedantry as it may appear when abused: it makes the structure of proofs and the identification of counter-examples easier for beginners. There are plenty of worked problems, with hints for some; but it is stated (page 367) that the answers "cannot be guaranteed correct", and that the price (£1.50) of complete sets of solutions (guaranteed!) is subject to revision. It seems that even the most deterministic mathematics has aleatory aspects!

Cometary mission

Introduction to Comets
 by John C. Brandt and Robert D. Chapman
 Cambridge University Press, £21.00
 ISBN 0 521 23906 0

Cometary science is a rich and complex field. Just as the prospective return of comet Halley in 1985-86 is currently inducing a boom in research activity (with the space mission fraternity switching allegiance, the association of comets with disease and, paradoxically, life on Earth is stimulating widespread popular interest. Most of *Introduction to Comets*, however, is well above the popular level. Although it is a specialist survey appropriate to postgraduate and research scientists, the book does open with a historical first section, which illustrates the importance of comets to the development of Greek and medieval science. Aristotle, for example, countered Hippocrates' claim that comet tails were optical illusions by attempting to explain their irregular nature as meteorological phenomena. Tycho Brahe's careful sixteenth-century observations established using parallax methods that comets must have originated far beyond the Moon. The high elongation of their orbits clashed with the conception that planets were attached to crystal spheres and that heavenly bodies moved in perfect circles. And by developing analytical methods to take advantage of Tycho's observations, such people as Edmund Halley

A Second Course on Real Functions
 A. C. M. VAN ROOIJ and W. H. SCHIKHOF
 When considering a mathematical theorem one ought not only to know how to prove it but also why, and whether any given conditions are necessary. All too often little attention is paid to this side of the theory and in writing this account of the theory of real functions the authors aim to rectify matters.
 Hard covers £15.00 net
 Paperback £6.95 net

A Pathway Into Number Theory
 R. P. BURN
 This book consists of a sequence of exercises which will lead readers from quite simple number work to the point where they can prove independently the classical results of elementary number theory for themselves. It is designed for use as an undergraduate course.
 Hard covers £18.00 net
 Paperback £7.50 net

CAMBRIDGE UNIVERSITY PRESS

BOOKS
 MATHEMATICS AND PHYSICS

Testing relativity

Theory and Experiment in Gravitational Physics
 by Clifford M. Will
 Cambridge University Press, £37.50
 ISBN 0 521 23237 6

Before 1960, the experimental status of Einstein's theory of gravitation, general relativity, was extremely tenuous. In essence there were in existence only the three so-called classical tests, namely the gravitational red-shift, the deflection of light, and the anomalous perihelion shift of Mercury. In fact, the observational evidence for the red-shift was very unreliable and in any case was only a test of the underlying principle of equivalence and not directly of the full theory. Again, in spite of the public sensation attracted by the reported discovery of light bending after the end of World War I, it seems in retrospect that the test is imprecise, giving no better than a 50 per cent agreement with the theory. This left the one test of moderate precision, namely the advance in the perihelion of Mercury, which general relativity could account for with an accuracy of about 1 per cent. A large number of alternative gravitation theories have since been proposed, most of which are consistent with the original classical tests. However, the past two decades have witnessed significant advances both in our understanding of alternative theories and through the advent of high-precision space technology, in deriving significantly more accurate tests which can discriminate among many of them. Will's excellent book provides a detailed and complete exposition of these advances. Following the pioneering work of the experimentalist and theoretician Robert Dicke, Will starts by carefully examining the equivalence principle and its relation to the foundations of gravitation theory. The resulting basic framework is already sufficient to suggest that half a dozen theories are not viable. This approach leads one to consider exclusively metric theories of gravity, which can then be confronted directly by solar system observations. To this end, Nordtvedt in 1968 and subsequently Will developed a framework for discussing both the theories and the tests. Known as the "parametrized post-Newtonian" or PPN formalism, it takes the slow-motion, weak-field or post-Newtonian limit of metric theories of gravity and characterizes them by a set of ten parameters. As each theory has particular values for these parameters, the formalism is ideal for comparing competing theories. A large part of the book is devoted to a systematic development of the PPN formalism (whose detailed nature is such that it really forces the book into a specialist category). The formalism is then applied to recent high-precision tests of light deflection, perihelion shift, and the time-delay of light (surprisingly first

suggested only in 1964, even though it results immediately from light bending). The accuracy of these tests allows another score of alternative theories to be ruled out. In fact, if the various metric theories are plotted in parameter space (so arranged that general relativity is at the origin) then the net effect of these classical tests, together with measurements of the Earth's rotation rate and Earth tides, is that viable gravitation theories must lie in a small region surrounding the origin. Thus, although such theories can accommodate adjustments of arbitrary parameters in their formulation, the experimental evidence points to general relativity as being still the simplest and to that extent the "best" gravitation theory. The next section turns its attention to the future possible use of gravitation radiation as a tool for testing alternative theories, even though these effects await the arrival of gravitational wave astronomy, confidently anticipated in the next decade or two. This theoretical discussion is allied to the astrophysical observations of pulsars in 1976, the X-ray source (and best known candidate for a black hole) Cygnus X1 in 1971, and the binary pulsar PSR 1913 16 in 1974. This last discovery indirectly yields the first evidence for the existence of gravitational waves, for if the rotating system is emitting gravitational radiation then there should be a consequent damping of its orbit. In 1978, a secular decrease in the period was announced, and it seems to be consistent with the predictions of general relativity. Will details the calculations for this and other theories, and in a final chapter sketches how cosmological observations such as the cosmic microwave background and the abundances of the light elements may also help to determine the most viable theory of gravitation. This well argued and comprehensive treatment will clearly be of most value to the experimental and observational community of research workers in this field. However, many theoreticians may, at the very least, wish to grace their shelves with a copy if only to rest content that their work is at last gaining respectability as gravitation theory acquires a growing basis of empirical solidity.

Ray d'Inverno
 Ray d'Inverno is lecturer in applied mathematics at the University of Southampton.

Cometary mission

Introduction to Comets
 by John C. Brandt and Robert D. Chapman
 Cambridge University Press, £21.00
 ISBN 0 521 23906 0

From Hungary

- Combinatorial Methods of Discrete Programming ISBN 0 08 0881-2 £13.50
- Mathematical Models in Computer Systems ISBN 0 08 08700-7 £19.80
- Power Electronics - Problems ISBN 0 08 08554-3 £21.50
- Studies on Mathematical Programming ISBN 0 08 0828-4 £9.50

Write for our catalogues
 Collett's, Dunnington Estate, Wellborough, Wetherby WSG 2BT, Tel: (0635) 224881

provided vital impetus for the theories of mathematics and mechanics put forward by Isaac Newton. Modern cometary science uses methods from statistics, particle and gas dynamics, and from plasma physics and spectroscopy; it also requires the consistency of ionic, molecular and surface chemistry. By applying all these methods to the interpretation of observations of uncertain reliability, comets constitute an excellent context for the introduction of a range of scientific techniques and methodology. John Brandt and Robert Chapman of NASA's Goddard Space Flight Center give an exciting taste of all this in their concise but wide-ranging survey, concentrating on research carried out during the past decade. Briefly, they cover ideas concerning the origin of comets as accompanying or independent of the origin of the planetary system; their structure, particularly the favoured icy-conglomerate model which envisages jets of escaping material to explain observed deviations from gravitational orbits; their probable role as sources of zodiacal light particles, upper atmosphere Brownlee particles and meteors; dust and gas comas, spectroscopically observed using ultraviolet through to radio wavelengths; and their interaction with the solar wind producing the structured ion tail. The survey ends with possible space missions, now of course overtaken by events. Linger American hopes of a NASA mission to comet Halley having been finally crushed by President Reagan's latest budget, only four shots at Halley are now planned: the Japanese "Planet-A"; two Soviet "Venera" spacecraft passing first around Venus; and the European Space Agency's "Giotto", their first interplanetary mission. At a pedagogical level, however, the survey is rather deficient, as it is generally uncritical of current theories and fails to maintain a clear distinction between physical or mathematical models and the complex reality of comets. For example, an unphysical velocity distribution of a collisionless point source is used without comment (page 108). The results of Probst's gas-dynamic calculations on dust are reproduced (page 122) without the caution that they apply only for a single size of dust grain with improbable optical properties. The vaporization equation is integrated over the day and night sides of the comet nucleus (page 128), although temperature and outgassing rates doubtless vary strongly around it. On the diffusion-equation description of comet orbit variations, the erroneous van Woerkom solution, which requires an infinite number of comets barely attached to the solar system, is repeated (figure 5.13 and page 147; Yabushita in 1980 published the correct solution). Comets Encke and Kopff are cited as typical derivations of jet forces (shown without error bars, figures 3.9 and 3.10), although these are exceptional, other results being quite erratic. The references are an idiosyncratic mélange and far too numerous for the interested non-specialist. And although reviews of cometary science are common, despite Europe west of the Urals led the field during the past decades, it would have been refreshing if the British publisher had tried harder to curtail the bias here. Cambridge University Press have, however, maintained their high production standards, an abundance of plates and figures making an attractive presentation, with very few significant errors. Indexes for comets and names-subjects are provided, although coverage in the latter is limited: "albedo", "Jacobi", "C" and "magnetic field", for example, were omitted. Although I can recommend the book to libraries, there is still room, for a much better account during this predicted "golden decade" of cometary science.

Principles of Real Analysis
 C. D. Allwright and O. Burkinshaw
 ... the authors have succeeded in writing a very good text... The book begins with a clear but condensed account of set theory and metric spaces... At every stage there are large and varied collections of examples and exercises, and these are an excellent feature of the book... cover every level of difficulty."
 - *THEIS*
 £16 boards 300 pages

Principles of Superconductive Devices and Circuits
 T. Van Duzer and C. W. Turner
 ... an extremely good physics text on the theory of Josephson junctions and the microscopic theory of superconductivity... can be warmly recommended to anyone with an interest in the physics of superconductors."
 - *Physics Bulletin*
 £20 boards 384 pages

Foundations of Optical Waveguides
 Gilbert H. Owyang
 Optical communications involves specialized knowledge of electromagnetism, solid state electronics and communication theory. This book concentrates on the first area, providing a detailed theoretical treatment of the electromagnetic wave problems which are relevant to optical waveguides.
 £25 boards 262 pages

Introduction to Queuing Theory
 Second Edition
 Robert B. Cooper
 A treatment of queuing theory which is well balanced between the theoretical and practical aspects.
 £14 boards 366 pages

Advanced Strength and Applied Elasticity
 A. C. Ugural and S. K. Fenster
 The authors present the theory of stress analysis and elasticity, and include useful numerical techniques which may be used with the aid of a computer.
 £18 boards 450 pages

A Modern Course in Statistical Physics
 L. E. Reichl
 "His book is quite the best of its kind that I know of. It will be read with profit by raw beginners and experienced researchers alike, and should quickly find its way onto a great many bookshelves."
 - *Contemporary Physics*
 £25 boards 722 pages

Introduction to Mathematical Programming
 B. Lev and H. J. Wiese
 A straightforward, non-theoretical introduction to mathematical programming for the student or business manager who is not strongly mathematically oriented.
 £17.50 boards 256 pages Publication April

Stochastic Systems for Management
 W. K. Grassman
 A well rounded treatment of the stochastic aspects of operations research using the theory of Markov chains.
 £15 boards 370 pages

Modern Algebra
 A Constructive Introduction
 Ian Connell
 A fine blend of modern and classical algebra. The treatment is entirely self-contained and very thorough with an unusually rich assortment of exercises for the student.
 £15 approx boards 464 pages Publication May

SCIENCE in AMERICA

A Documentary History, 1900-1939
 edited by Nathan Reingold & Ida H. Reingold

1900-1939 was a period when the work of American investigators became central to scientific advances in many fields, and this collection of documents conveys personalities and issues with an immediacy hard to capture in conventional historical narratives. From those letters, memoranda, and other records - written during the course of the events described and for the most part previously unpublished - emerges a fresh, intimate, often striking picture of the life of science in the United States. Published February 1982, £38.25

THE UNIVERSITY OF CHICAGO PRESS
 126 Buckingham Palace Road, London SW1W 9SD

Universities continued

LONDON UNIVERSITY OF THE LONDON SCHOOL OF ECONOMICS

LECTURERSHIP IN THE DEPARTMENT OF ACCOUNTING AND FINANCE

Applications are invited for an appointment to the Lectureship in the Department of Accounting and Finance...

Appointments will be on the salary scale for lecturers in the University of London...

LONDON UNIVERSITY OF LONDON CAREERS ADVISER

Applications are invited from graduates for appointment to vacant posts in the careers advisory service...

The duties of the post involve providing careers advice to students of the University...

MILTON KEYNES THE OPEN UNIVERSITY

ADVISER ON THE DISABILITY STUDENTS

Applications are invited for the post of Adviser on the Disability Students in the central office...

The Adviser is responsible to the Director of the Disability Services at Watton Hall...

OXFORD FROM ENGLISH

The lecturer is invited to prepare to an election to the Professorial Chair of English Literature...

LIVERPOOL UNIVERSITY OF THE LIVERPOOL SCHOOL OF EDUCATION AND EDUCATION

RESEARCH FELLOWSHIP IN THE DEPARTMENT OF EDUCATION

Applications are invited for a research fellowship in the Department of Education...

Appointments will be on the salary scale for lecturers in the University of Liverpool...

LONDON KING'S COLLEGE (University of London)

LECTURERSHIP IN MUSIC

Applications are invited for a Lectureship in Music, tenable from October 1982...

The principal teaching duties for each year will be in Historical Musicology...

NEWCASTLE UPON TYNE UNIVERSITY OF THE NORTH

SCHOOL OF EDUCATION

Applications are invited for the post of Lecturer in Education...

Applicants should have good academic qualifications and teaching experience...

OXFORD POLYTECHNIC

DEPARTMENT OF PROFESSIONAL STUDIES

LECTURER IN SENIOR LECTURERSHIP IN EDUCATION

Applications are invited for a Lectureship in Education...

ZIMBABWE UNIVERSITY OF ZIMBABWE

RESEARCH FELLOWSHIP IN THE DEPARTMENT OF ARTS

Applications are invited for a research fellowship in the Department of Arts...

RESEARCH FELLOWSHIP

Applications are invited for a research fellowship in the Department of Arts...

SURREY ROYAL HOLLOWAY COLLEGE (University of London)

LECTURER IN DRAMA AND THEATRE STUDIES

Applications are invited for a Lectureship in Drama and Theatre Studies...

TEMPORARY LECTURER

Applications are invited for a temporary lectureship in the Department of Education...

OXFORD WOLFFSON COLLEGE

RESEARCH FELLOWSHIP IN RELIGIOUS STUDIES

The College proposes to select a Junior Research Fellow in Religious Studies...

NEWCASTLE UPON TYNE UNIVERSITY OF THE NORTH

SCHOOL OF EDUCATION

Applications are invited for the post of Lecturer in Education...

OXFORD POLYTECHNIC

DEPARTMENT OF PROFESSIONAL STUDIES

LECTURER IN SENIOR LECTURERSHIP IN EDUCATION

Applications are invited for a Lectureship in Education...

LEICESTER UNIVERSITY OF LEICESTER

POSTGRADUATE STUDENTSHIP IN THE COMMUNICATIONS RESEARCH CENTRE

Opportunities exist for postgraduate students to conduct research in the Communications Research Centre...

RESEARCH FELLOWSHIP

Applications are invited for a research fellowship in the Department of Education...

SHEFFIELD UNIVERSITY OF SHEFFIELD

LECTURER IN SENIOR LECTURERSHIP IN EDUCATION

Applications are invited for a Lectureship in Education...

TEMPORARY LECTURER

Applications are invited for a temporary lectureship in the Department of Education...

OXFORD WOLFFSON COLLEGE

RESEARCH FELLOWSHIP IN RELIGIOUS STUDIES

The College proposes to select a Junior Research Fellow in Religious Studies...

NEWCASTLE UPON TYNE UNIVERSITY OF THE NORTH

SCHOOL OF EDUCATION

Applications are invited for the post of Lecturer in Education...

OXFORD POLYTECHNIC

DEPARTMENT OF PROFESSIONAL STUDIES

LECTURER IN SENIOR LECTURERSHIP IN EDUCATION

Applications are invited for a Lectureship in Education...

KINGSTON POLYTECHNIC

APPLYING FOR SUITABLY QUALIFIED CANDIDATES FOR THE FOLLOWING VACANCIES AT SENIOR LECTURER OR LECTURER II LEVEL:

School of Business

SL/LI Accounting and Management Information Systems (ref: BAM)

SL/LI Accounting with special reference to Taxation/Financial Accounting (ref: BA)

SL/LI Business Administration with special reference to International Business/Marketing/Decision Sciences/Market Research/Operations Management (ref: BB)

School of Chemical and Physical Sciences

SL/LI Physics with an interest in an applied area such as Acoustics, Ultrasonics, Radiation Physics or Microelectronics (ref: CP)

LII Life Sciences with interests in Microbiology, Cell Biology and Biological Chemistry (ref: CL)

School of Civil Engineering

SL/LI Civil Engineering, able to teach Engineering Mechanics or Construction Materials and Practice (ref: CV)

School of Economics and Politics

LII Economics or Quantitative Methods (ref: EQ)

LII (temporary) Economics (ref: EE)

School of Fine Art

SL/LI Sculpture (ref: FA)

Kingston Regional Management Centre

SL/LI Operations/Production Management (ref: KOP)

SL/LI Financial Management (ref: KFM)

SL/LI Operations/Process Control Management (ref: KOM)

SL/LI Business Development and Marketing (ref: KBD)

School of Mathematics

LII Mathematics or Statistics (ref: MM)

School of Surveying

SL/LI Valuations for Estate Management (ref: SV)

School of Teacher Education and Music

SL/LI Music Education (ref: TME)

SL/LI Teaching of Science (Physical Science) (ref: TS)

SL/LI Teaching of Mathematics (ref: TM)

School of Three-dimensional Design

SL/LI Furniture Design/Crafts

Salary ranges: Senior Lecturer £9,624-£11,328 (bar); £12,141 + £498 London allowance; Lecturer II: £6,462-£10,431 + £498 London allowance...

BRISTOL POLYTECHNIC

DEPARTMENT OF CONSTRUCTION AND ENVIRONMENTAL HEALTH

LECTURER II/SENIOR LECTURER IN TECHNOLOGY/SCIENCE

Applications are invited for the post of Lecturer II or Senior Lecturer in the Department of Construction and Environmental Health...

TEMPORARY LECTURER

Applications are invited for a temporary lectureship in the Department of Construction and Environmental Health...

OXFORD WOLFFSON COLLEGE

RESEARCH FELLOWSHIP IN RELIGIOUS STUDIES

The College proposes to select a Junior Research Fellow in Religious Studies...

NEWCASTLE UPON TYNE UNIVERSITY OF THE NORTH

SCHOOL OF EDUCATION

Applications are invited for the post of Lecturer in Education...

OXFORD POLYTECHNIC

DEPARTMENT OF PROFESSIONAL STUDIES

LECTURER IN SENIOR LECTURERSHIP IN EDUCATION

Applications are invited for a Lectureship in Education...

OXFORD POLYTECHNIC

DEPARTMENT OF PROFESSIONAL STUDIES

LECTURER IN SENIOR LECTURERSHIP IN EDUCATION

Applications are invited for a Lectureship in Education...

BRISTOL POLYTECHNIC

DEPARTMENT OF PROFESSIONAL STUDIES

LECTURER IN SENIOR LECTURERSHIP IN EDUCATION

Applications are invited for a Lectureship in Education...

TEMPORARY LECTURER

Applications are invited for a temporary lectureship in the Department of Education...

OXFORD WOLFFSON COLLEGE

RESEARCH FELLOWSHIP IN RELIGIOUS STUDIES

The College proposes to select a Junior Research Fellow in Religious Studies...

NEWCASTLE UPON TYNE UNIVERSITY OF THE NORTH

SCHOOL OF EDUCATION

Applications are invited for the post of Lecturer in Education...

OXFORD POLYTECHNIC

DEPARTMENT OF PROFESSIONAL STUDIES

LECTURER IN SENIOR LECTURERSHIP IN EDUCATION

Applications are invited for a Lectureship in Education...

OXFORD POLYTECHNIC

DEPARTMENT OF PROFESSIONAL STUDIES

LECTURER IN SENIOR LECTURERSHIP IN EDUCATION

Applications are invited for a Lectureship in Education...

Polytechnics continued

SHEFFIELD CITY POLYTECHNIC HEAD OF DEPARTMENT OF ACCOUNTANCY AND COMPANY ADMINISTRATION

Applications are invited for the above post which will become vacant on 1st September 1982...

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING LECTURER II

Applicants should preferably have a higher degree and relevant industrial/research experience...

ULSTER POLYTECHNIC Faculty of Technology LECTURER II/SENIOR LECTURER Mechanical Engineering (Control Systems)

Salary Scales: Senior Lecturer £9,624-£11,328/£12,141 Lecturer II £6,462-£10,431

Applicants should be experienced in the field of control systems, should possess a relevant degree and have research or industrial experience...

SUNDERLAND POLYTECHNIC Faculty of Education YOUNG PEOPLE IN THE CITY SALARY

Senior Lecturer 'A' £11,112-£12,357 (bar) - £14,019

Applicants should have a first degree in Social Sciences or a related subject...

For Sale and Wanted

Application form and particulars may be obtained from the Director of Education...

COLLEGES AND DEPARTMENTS OF ART

DARTINGTON COLLEGE OF ARTS PRINCIPAL

The Governors are seeking to appoint a successor to Peter Cox who is retiring at the end of the 1982/83 academic year...

Colleges and Institutes of Technology

SURREY COUNTY COUNCIL NORTH EAST SURREY COLLEGE OF TECHNOLOGY

Applications are invited for the following post which is available from 1 September, 1982 or as soon as is possible:

Head of the Department of Community & General Education (Grade IV Department)

The successful applicant will possess a good honours degree of a British University or an equivalent qualification...

GLASGOW COLLEGE OF TECHNOLOGY SENIOR LECTURER 'A'

The Glasgow College of Technology, a major polytechnic institution, of higher education, invites applications for the following post:

EDGEMOUNT COLLEGE OF HIGHER EDUCATION TEMPORARY LECTURER IN INDIAN MOVEMENT STUDIES

Applications are invited for a temporary lectureship in the Department of Indian Movement Studies...

EDGEMOUNT COLLEGE OF HIGHER EDUCATION DEPARTMENT OF LANGUAGE, LITERATURE AND DRAMA

Applications are invited from graduates for this temporary post which is tenable during the Academic Year 1982-83...

CAMBRIDGESHIRE COLLEGE OF ARTS AND TECHNOLOGY SENIOR LECTURER IN INDIAN MOVEMENT STUDIES

Applications are invited for a senior lectureship in the Department of Indian Movement Studies...

Applicants should have a first degree in Indian Movement Studies or a related subject...

Lecturer II/Senior Lecturer in Mathematical Education

Applications are invited for a one year temporary post in Mathematical Education from the commencement of the Autumn Term 1982.

Crewe-Alsager College of Higher Education

Applications are invited for a one year temporary post in Mathematical Education from the commencement of the Autumn Term 1982.

EDGEMOUNT COLLEGE OF HIGHER EDUCATION SENIOR LECTURER 'A'

The Glasgow College of Technology, a major polytechnic institution, of higher education, invites applications for the following post:

EDGEMOUNT COLLEGE OF HIGHER EDUCATION TEMPORARY LECTURER IN INDIAN MOVEMENT STUDIES

Applications are invited for a temporary lectureship in the Department of Indian Movement Studies...

EDGEMOUNT COLLEGE OF HIGHER EDUCATION DEPARTMENT OF LANGUAGE, LITERATURE AND DRAMA

Applications are invited from graduates for this temporary post which is tenable during the Academic Year 1982-83...

CAMBRIDGESHIRE COLLEGE OF ARTS AND TECHNOLOGY SENIOR LECTURER IN INDIAN MOVEMENT STUDIES

Applications are invited for a senior lectureship in the Department of Indian Movement Studies...

Applicants should have a first degree in Indian Movement Studies or a related subject...

Inner London Education Authority Principal

Applications are invited for the post of Principal of Hammersmith and West London College which falls vacant on 31 August 1982...

Colleges with Teacher Education

NORTH YORKSHIRE COUNTY COUNCIL
SCARBOROUGH NORTH RIDING COLLEGE OF EDUCATION
Applications are invited for the following appointment from 1st September, 1982 in a College which is concerned principally with Teacher Education:
PRINCIPAL LECTURER IN IN-SERVICE EDUCATION
Salary: £11,298-£14,238 p.a. depending on experience.

Administration

SHEFFIELD CITY POLYTECHNIC UNION OF STUDENTS
SENIOR PERMANENT OFFICER
Salary - PO2 Scale in accordance with Local Government Regulations between £10,000 and £13,000 depending on experience.
The Union of Students provides social, political, welfare, sporting and trading facilities to some 10,000 students on five Sites and the job holder will be responsible to the Executive for the day to day running of the Union, and the implementation of Union Policy.

Examiners

UNIVERSITY OF LONDON UNIVERSITY ENTRANCE AND SCHOOL EXAMINATIONS COUNCIL. GENERAL CERTIFICATE OF EDUCATION
The Council invites applications for the following Chief Examiner appointments:
ADVANCED LEVEL
General Studies from June 1983
ORDINARY LEVEL
Government and Political Studies from June 1983
Mathematics Syllabus A from June 1984

Holidays and Accommodation

CHEAP HOLIDAYS FOR TEACHERS
UNION CREATIVE...
All advertisements are subject to the conditions of acceptance of Times Newspapers Ltd, copies of which are available on request.

Overseas

KUWAIT UNIVERSITY OF KUWAIT Faculty of Medicine
ENGLISH LANGUAGE INSTRUCTORS
Applications are invited for five posts of Instructor to teach English language and study skills courses to medical students and paramedical students. The posts will be tenable from September 1, 1982.

Teachers Saudi Arabia
£12-14,000 + minimum £3000 overseas allowance
The position of ARAMCO as the world's largest oil producing company necessitates their involvement in a number of massive projects. These include the teaching of English as a Foreign Language to Saudi Arab company trainees.

NATIONAL UNIVERSITY OF SINGAPORE PROFESSORSHIP IN PHILOSOPHY
Applications are invited for appointment to a full Professorship in the Department of Philosophy in the Faculty of Arts & Social Sciences from candidates who should possess outstanding academic records with considerable university teaching/research experience.

UNIVERSITY OF CAPE TOWN
Senior Lecturer/Lecturer in Psychology
Applications are invited for the above posts, one senior lectureship and three lectureships are vacant. Candidates should indicate for which level they wish to apply.

ARAMCO
The company offers an excellent benefits package including low-rental air conditioned accommodation and company paid return air flights, together with free medical care, excellent recreational facilities and good long term prospects.

MITCHELL COLLEGE OF ADVANCED EDUCATION AUSTRALIA
Senior Lecturer/Lecturer in Marketing
The appointee will join an existing team of two staff members in the marketing area and will teach in courses such as the Bachelor of Business degree (which has a full major in Marketing) and the Graduate Diploma in Marketing.

Overseas continued

Western Australian Institute of Technology
Principal Lecturer Head of Department
LIBRARY AND INFORMATION STUDIES
The Department offers a Bachelor of Applied Science (Library Studies) course and a Graduate Diploma in Library Studies programme. Post graduate Diploma and Master's programmes in Library and Information Studies are in an advanced stage of planning for introduction in 1983.

Yamouk University
Yamouk University teaching applications for teaching posts in the fields of translation and interpretation from English into Arabic and from French into Arabic and vice versa.

ALBERTA UNIVERSITY OF EDUCATION
MULTI-DEPENDENT GRADUATE PROGRAM ASSISTANT PROFESSOR
To prepare teachers and other personnel to work in the field of education, the University of Alberta has developed a comprehensive Graduate Program in Education.

Universities Continued

LONDON UNIVERSITY OF THE LONDON SCHOOL
Lectureship in Systems
Applications are invited for a lectureship in Systems in the Department of Systems in the University of the London School.

SENIOR LECTURER 'A' IN CONSUMER AFFAIRS
(Post Ref: 82/05)
£11,139(x3) to £12,359 (Bar) (x4) to £14,079
Applications are invited for the above post which is primarily concerned with the further development of the SHND Course in Consumer and Business Studies. The post also involves responsibility for the work of the College Consumer Advisory Centre.

RESEARCH STUDENTSHIPS
(S.S.R.C. Quota Awards)
Applications are invited for two S.S.R.C. Studentships, tenable for one or two years from October, 1982, to pursue post-graduate research leading to the degree of M.Ed., M.Sc. (Speech) or Ph.D. by thesis.

BRADFORD UNIVERSITY OF POSTDOCTORAL RESEARCH ASSISTANT
Applications are invited for a post-doctoral research assistant position in the Department of Chemistry at Bradford University.

Research Studentships

UNIVERSITY OF NEWCASTLE UPON TYNE School of Education
RESEARCH AND INFORMATION ASSISTANT
The Students' Union at Reading University requires someone with experience in Higher Education and/or Student Unions to fill a post involving:

DUNDEE UNIVERSITY OF Dental Health Services Research Group
RESEARCH ASSISTANT
Applications from individuals who are currently employed in the dental health services or who are available to work within the NHS in Scotland are invited.

THE QUEEN'S COLLEGE GLASGOW
A Scottish Central Institution.
1 Park Drive, Glasgow, G3 7LF. Tel: 041-334 8141.

Would subscribers to the TIMES HIGHER EDUCATION SUPPLEMENT in future please direct all correspondence and enquiries to: Times Newspapers Limited
Supplements Subscription Manager
Oakfield House 35 Perrymount Road Haywards Heath West Sussex RH16 3DH

Personal

IMMEDIATE ADVANCES £100 to £2000...
Working under the direction of the Director of Finance and in the number of accounts and non-teaching staff this position offers a wide range of high level investigations and reviews concerned with all aspects of Polytechnic management.

Don's diary

Monday

Final four-hour thrash down the motorway before house stops being 300 miles away from my new job. The economics of this government's much vaunted geographic mobility in the search for work is going to cost me around £6,000 - at a conservative estimate. It's going to take a long time to recoup this from increased earnings. Must drop a note to Margaret about this transfer of monies to non-industrial sectors of solicitors, estate agents, etc.

Crosskeys was the first tertiary college in Wales and one of the first in the United Kingdom. As a consequence today marks the arrival of the *Overstambulator* Thomas and Taylor. In other words this is the first day of the first full Welsh Her Majesty's Inspectorate inspection of a tertiary. This places a great deal of responsibility on us and we are concerned to maintain the distinction between monitoring us as an institution, and as a tertiary. Judgments on the one shouldn't cloud judgments on the other.

Tuesday

Letter from Wales' Manpower Services Commission saying that new guidelines for high quality Youth Opportunities Programmes will delay all approvals. Decisions will not be made before early June. Letter followed within 48 hours by a telephone call from Training Services Division of MSC approving two of our proposals.

Main event of the day is a meeting of the senior management team. *Overstambulator* Thomas in attendance. Much discussion about the visual messages given off by college and a proposed working conference in 1983. Also spend some time considering a new course development proposal aimed at educating for capability. One of a new breed this, being activity-based learning and inter-disciplinary.

HMI now scurrying over the curriculum like bees round the honeypot. As far as I can make out they've seen everyone and I feel quite left out and keep asking why they haven't seen me? Have I got BO?

Beginning to find out where "communication skills" are taught in the curriculum with a view to establishing a more effective use of resources. Idea of holding student case conferences is discussed.

Wednesday

What a day! Starts with a bit of ear-bending from a head of department about future plans for the college. Accompany principal on visit to assistant director of education to discuss a possible MSC proposal involving development of a top-shop for disabled but ensuring that the working experience is accompanied by opportunity for reflection and learning. Ideas well received and together with our tertiary conference proposal, likely to be taken to committees for support. We are the proposed education centre for disabled in the county and the top-shop activity would be a useful addition to education-work provision.

Just back in time to open post before meeting of academic board. Post contains potential contribution for *School Organization* on unity and change in the curriculum. HMI's report on secondary education has acted as a real catalyst on the school development front.

On to academic board. Have to chair this in absence of principal. Thank you Bill Good to see HMI. Thomas is still with us - he may be needed as part of our quantum. No, we're OK. Debate about our policy on O level re-sits for first year intake. What is our policy on O level re-sits for first year intake? And how do we implement it. One of the worries was directly connected with

Thursday

Today is the day the family knick-knacks are brought to Wales and await the morning. Because of move, change from pin-stripes to jeans. Note surprise of some HMI on greeting vice principal in this attire. To give them credit most control eyebrow raising to a millimetre or less.

HMI inspection continues. Apparently "things are going well". Various visits from HMI with particular responsibilities either confirming impressions or asking for information. Why should the vice principal know anything? In the light of my obvious state of ignorance in response to questions, I can only hope their leader has let them know of my recent arrival on the scene.

Friday

HMI starting to take a strong line by now. "They are of a mind" to close some toilets down because there are no locks on the doors. Remedial work to be carried out by Tuesday. We actually move in today - keep telephoning wife and children to make sure that arrangements run smoothly. Electricity Board telephone to confirm they have not cut the electricity off. High point of the day is a visit to student union executive to discuss curriculum development document. It's really good to see their interest and concern.

Inspection continues through next week. This weekend must begin promised paper on general versus vocational education as about systematic provision of learning experiences rather than a level versus TEC. On second thoughts, I'm not laying up beer and wine on way to new home this evening and

comparisons with school sixth forms. They do not have the continuing problems of students from six or more schools with what is, in effect, only six weeks of revision before the re-sit.

High point of the meeting was a proposal from the curriculum and staff development subcommittees. They were seeking approval for a curriculum-led review of the organization's effectiveness. Some real tensions began to show themselves. Excellent. Even those on different sides of the debate agreed that something of consequence was being discussed. In fact the review has already started. Questions such as "why use learning experience rather than teaching method?" "Curriculum rather than course?" "Are certain subjects more effective vehicles than others for developing specified skills?" indicate the purpose of the review is already on the way to being achieved.

Invitation to awards ceremony at one of our partner schools. It was certainly done well: a good show. My first introduction to high culture Welsh style. Welcome ceremony itself is just as I'd imagined Eurovision song contest from Caerdydd (my first Welsh word): introductions in Welsh, Spanish, Latin, French and finally English. The evening finished with *Hen Wlad Fy Nhadau*, the national anthem. This is something I should obviously have to learn. A lone Englishman not singing might be thought to be making some sort of protest.

Saturday

Have a bloody good weekend.

David Smetherham

The author is vice principal of Crosskeys Tertiary College and editor of *School Organization* and *School Organization and Management Abstracts*.

Three weeks ago *The THES* published an open letter from Professor Ray Pahl to Sir Keith Joseph that was both ominous and touchingly optimistic. Ominous in that it conjured up visions of Soviet-style repression of the social sciences in Britain. "I hope that I am mistaken when I seem to detect a growing intolerance towards social scientists in Britain which echoes that found in East Europe", he wrote. Sir Keith, he was sure, would join him in "resisting a move towards a more Eastern European style of emasculating and controlling all those intellectual currents which do not support one narrow set of opinions."

Optimistic, not only in this confidence, but in the belief that Sir Keith might be moved by his citing John Stuart Mill's thought that "the interests of truth require a diversity of opinions" and his observation that "the development of a vigorous social science demands a similar diversity". And touchingly so, in his claim that "the strength of all the social sciences in the West is to a large extent due to the fact that ideas have to stand the pressures of the intellectual marketplace."

I fear that Professor Pahl is on the wrong track, for two reasons. First, Sir Keith's commitment is to the marketplace, not to the intellectual marketplace (and he doesn't give a fig for the strength of the social sciences, in whose existence he is said to disbelieve). Not that he would dissent from Mill's noble thought. I am sure he would endorse it most warmly. But what if taking it seriously should, in practical terms, conflict with his commitment to freeing real, economic markets from controls and allowing their influence to extend throughout our social life?

Sir Keith is a convinced cultural elitist: no democracy of the intellect fellow of All Souls and junior minister. William Waidegrave, suggest on the BBC World Service, that public support of education in non-vocational subjects may turn out to be a relatively brief episode in world history.

Secondly Professor Pahl's East European scenario is misplaced. The road we are travelling does not lead in that direction. It leads to authoritarianism but of a different kind. To see where it might lead, it is perhaps instructive to look at where it has marked authoritarianism of President Pinchet's Chile.

I am not referring to the tens of thousands killed in the months after

A free market but with no free thinkers



Steven Lukes

the coup, nor to the elaborate system of repression and control then established, nor the extreme inequalities, manipulation of the media, destruction of agrarian reform and the entire welfare system. I refer rather to the legislation promulgated last year on higher education. "Free Market, Unfree Thought" by Hermann Schwemmer, former vice rector of the Catholic University of Chile, and Jerome Bear in *Index on Censorship* October 1981.

According to them, this legislation "amounted to the complete destruction of the country's liberal university system as it had been built since 1840". The military "delegates-rectors" running the universities since the coup had failed to produce wholly quiescent institutions, despite massive purges of students and staff and abolition of entire areas of study. So the new legislation dismembers existing universities - above all the University of Chile - transforming provincial faculties into professional training centres and drastically reducing student intake, while strengthening the Catholic University of Chile which houses the Friedmanite economists who still dictate the regime's economic policies.

But the legislation goes further and deeper, its central aim is to

make the universities serve a state driven by market mechanisms, and themselves "remaining subject to the general conditions of police surveillance and the law of supply and demand". Within the restricted range of disciplines still permitted, only those of the universities and will be for only ones for which university-based professional qualifications are required. These are law, architecture, biochemistry, pharmaceutical chemistry, surgery, dental surgery, agronomy, civil engineering, communications engineering, forestry, veterinary medicine and psychology.

The disciplines happen to attract the highest remuneration in the labour market, and their graduates success therein will be the measure of the universities' performance. Funds will be allotted them in proportion to their ability to attract the best students, as measured by standard selection tests, and non-paying students will be reduced to almost nil. All this aims to match demand for skill with supply of talent. There has even been talk of grading fees according to the market value of the professional qualifications for which students are training.

The net result, the authors write, "will be the draining of the universities' resources towards these high-status courses, while their traditional academic, cultural and research functions become progressively devalued. Training for less rewarding careers, such as education, philosophy or marine biology, will increasingly be left to private initiative, as will the diminishing number of traditional disciplines for which there is a demand and for which students can pay enough.

In consequence, "the central liberal *raison d'être* of the universities, as it has been understood in liberal Western tradition - namely, the origination and diffusion of knowledge and culture - is to be replaced by the purely pragmatic goal of producing professional according to market demand."

Thatcher's Britain is not to be compared to Chile. But it is like Reagan's America, undergoing a new counter-revolution in which, as James Tobin recently observed: "The old doctrines and policies, repudiated by new doctrines and policies, are 20 years ago". It is worth asking what that counter-revolution, and through to its conclusion, would involve. I doubt that Eastern Europe is the place to look for answers.

rearmament crusade. The universities had expressed "real interest" in assisting the national defence, said the Pentagon.

The mood of the campuses has indeed changed since Vietnam. Americans, who are incurably patriotic, no longer see anything intrinsically wrong with helping their own armed forces.

But the universities have a more acute reason for their renewed interest in the national defence. The Pentagon now consumes such a huge proportion of the nation's research budget that higher education simply must sign up for rearmament if it is to stay in business.

In 1983 the federal government will spend \$43,000m on research and development. More than half (\$24,500m) will go directly to the Department of Defence. This is not the whole story because other agencies, like NASA and the Energy Department spend lots of their research money on weapons development.

The Defence Department is already a strong player on the stage of academic science. A dozen universities are on the list of the Pentagon's top 500 defence contractors. All 12, including Stanford, MIT, Johns Hopkins and Pennsylvania, received more than \$10m from the Pentagon in 1981.

Big growth in the proportion of academic science funded by the Department of Defence raises a troubling question. Who owns the knowledge produced in a university system hooked on injections of Pentagon cash?

Twenty years ago it might have been possible to give a simple answer: A scientist conducting classical research on nuclear explosives or ballistics would have understood

the sponsors' objections to the findings being published in *Minsk* or *Vladivostok*.

The answer is today clouded by changes in the rate of technological change and the conjoining of scientific disciplines. If the weapons of the war are space based laser beams, biological organisms and stealth bombers, almost every discipline can be defined as militarily sensitive by a government sufficiently convinced of the perils of its enemies.

The universities would like to resolve this dilemma by keeping as tightly sensitive knowledge in secret compartments so that the rest of science is not polluted by the demands of national secrecy, but compartmentalization of science is no longer possible.

The CIA, for example, has gained the right to monitor the publication of knowledge about code-breaking. But the science of cryptography can no longer be surgically prised from its parent disciplines in mathematics. If a mathematician joins the sensitive list, what hope is there for open research on electronics, optics or astronomy?

There is another question. We do not yet possess a sociology of knowledge to probe it, but a pattern of research investment based on the quest to produce a science which is different in its substance and method from a science based on free-ranging intellectual appetite.

In what is rapidly becoming an economy, America's universities have no choice but to strike Faustian bargains with the Pentagon. But they should harbour no illusions about the high price to be paid.

America Today

Pentagon's deadly deal for research



Peter David

Relations between America's universities and the Pentagon, all but wrecked in the traumas of the Vietnam War, are on the brink of a startling renaissance.

Money is scarce in the United States and the top research universities have noticed that the Pentagon is the only federal agency in Washington which appears awash with ready dollars.

Two weeks ago the Pentagon defence science board, urged on by the Association of American Universities, told Congress that the campuses had to be enlisted in the president's

LETTERS TO THE EDITOR

Support for suburbia

Sir, - Peter Wilmott's perceptive analysis of the reasons for the social catastrophe of high rise flats (*THES*, March 12) omits two factors: the force of tradition and the role of medical officers of health.

The great pioneer of large-scale local authority housing was the London County Council. Where it led other authorities, especially Labour authorities, tended to follow. From the beginning it copied the Peabody example of replacing overcrowded slum dwellings with large blocks of flats. This tradition was given a great impetus by the 1935 Housing Act and resulted in the London landscape being dotted with immediately recognizable five storey neo-Georgian blocks. When in the post-war period the younger architects and planners in the LCC sought to break away from this stereotype the result was a variety of different designs and sizes of blocks of flats, with the use of new tower blocks to relieve the monotony of the layouts.

In the same period medical officers of health, who had used their

powers under Part III of the 1936 Act to condemn the terrible pre-war slums, increasingly used them to condemn "unfit for human habitation" rows of terraced houses (each with its own garden or back yard) which were quite capable of being rehabilitated and these terms, instead, additional adjoining houses were purchased, tenanted, rehoused, and the properties demolished in order to provide a "decent sized" and shaped site for architectural redevelopment.

Where vacant sites (often bomb sites) were purchased under Part V of the Housing Act 1936 large areas of surrounding occupied property were added to provide land for building houses to meet the general housing need; even though the net housing gain, after rehousing tenants, was often very small, especially in relation to total cost. Tower blocks resulted in no gain in accommodation since the density of development for each site was strictly determined by the density zone in which it lay.

Polys know how to manage money

Nune of those engaged in LCC housing in the 1950s (including myself on the administrative side of acquiring housing sites), saw the possibilities and desirability of filling in gaps in terraces with houses of the same kind, or of using high density town houses rather than flats as the predominant form of housing on inner-city schemes.

In part this process was unconsciously fuelled by the need to provide work for the large housing acquisition and housing architects divisions built up in the immediate post-war period. It is a sorry story for which tens of thousands of working-class Londoners are still paying the price. The lessons to be learnt are first, the vital importance of open government and public discussion, and secondly the need for those taking decisions to put themselves in the position of those whose lives they are altering.

Yours sincerely,
LESLIE MACFARLANE
St John's College, Oxford.

Duplication is wasteful

Sir, - On February 21 the Minister for the Arts announced in the House of Commons that he had decided to allocate the papers of the first Duke of Wellington, accepted for the nation in lieu of capital transfer tax, to the University of Southampton.

This decision has caused considerable surprise and disquiet throughout the Society of Archivists, on whose behalf I write.

Archives accepted in this way in lieu of tax are, by definition, of pre-eminent national interest and when their allocation is being considered a number of factors must be taken into account, including their relevance to the existing archive holdings of the institutions under consideration and the wishes of the previous owner, but it is surely of paramount importance that the archives should go where the care that is offered can meet the highest professional standards.

The minister has made his decision subject to the University of Southampton providing the necessary secure accommodation, but there remains the question of qualified archive staff and the provision of archives conservation facilities, both essential if the Wellington papers are to be cared for adequately.

Yours faithfully,
CYNTHIA SHORT
Honorary Secretary,
Society of Archivists.

doubt money could be found from trust funds outside the university, but it is proper that at this time of financial constraint large sums of money should be spent on duplicating facilities which exist elsewhere?

The Society of Archivists understands that the minister is concerned that archives accepted in lieu of tax should not always be allocated to national institutions in London and it supports this policy. But there are other institutions outside London which can already provide the full range of archival care and which might have been considered before an institution was chosen which has no facilities at present and which can offer to provide them only at considerable expense.

It is perhaps too late for this decision to be reconsidered, but the Society of Archivists hopes that when similar decisions have to be made in the future more weight will be given not only to the provision of suitable accommodation but also to the standard of professional care, and the facilities for established archive repositories will be looked at carefully before it is decided to allocate archives of national interest to institutions which have to use up valuable resources to create the facilities for this special purpose.

Living off their wits

Sir, - Patrick Nutgens in "The Danger with Nonentities" (*THES*, March 5) might have reflected that what is even more fatal are nonentities with power without responsibility. However, I have no reason to doubt that he is as good a teacher as he is a communicator. To the extent that this is true I am not writing about him. It is rather his distinction between the two kinds of people found in our institutions that I would like to elaborate on. My distinction is between those who parasitically trade on their legitimizing what is really spurious. After cataloguing the spurious variety, Dr Nutgens identifies the "people who do the job - in our case teaching". It is what "our" disguises that concerns me. If we focus a little more closely on (say) a college of further education or polytechnic rather than on the generalized institution of education, we might find that "politicians", "demagogues", "megalomaniac bureaucrats" and "people who grind you down" abound, emphatically redefined as administrators, coordinators and perhaps even principals and directors.

What has happened and is still happening within our colleges and polytechnics is that huge bureaucratic structures are imposed on the vocation of teaching and the only thing that is obvious about the relationship between the two is that within the former are the big salaries and the outrageous perks. The greater the distance from the chalk face the greater the opportunities for what is often seen as organized plunder.

Many elected representatives of the whole community feel it is they who are being "kicked about" by people who are more benefited than burdened by public expenditure on education. I say this as one who wants more to be spent on teaching and not simply from a redirection of resources within the present set-up. What, then, does the spurious kind of teacher do if he does not teach? Don't tell me: he man-manages or coordinates those who do. It is not just the misallocation of resources, but the "political" inheritance in such non-functional bureaucratic structures - actually corrupts the necessary integrity of the teacher.

Yours faithfully,
ELIZABETH NASH
Chairman Leisure Services Committee,
Leeds City Council.

UMIST cuts are necessary

Sir, - Your report "UMIST Cuts Not Needed" (*THES*, March 19) gave an inaccurate account of the conclusions of the report prepared by accountants Arthur Andersen & Company. You must distinguish between the principal findings of the report, and the comments of the AUI.

The report found that UMIST's financial forecasts had been prepared on a "worst possible basis". The UMIST council, which fully understood this, has left £783,000 of the prospective deficit in 1983/4 uncovered in the hope that any one or a combination of factors, including those cited in your article, eg capital works and investment income etc., might contribute, in the light of experience to an improvement in the financial position and an elimination of the deficit. The recent announcement that overseas student fees will reduce next session, in real terms, and impending wage awards above those provided in the estimates, threaten a further deterioration in the cautious financial forecasts which formed the basis for 24 per cent cuts.

The comments of the AUI and their alternative strategies raise false hopes based on a false premise.

Yours faithfully,
D. G. KEEN-LESLIE,
Bursar,
University of Manchester Institute of Science and Technology.

CNAAs from universities?

Sir, - Ngalo Crequer's account (*THES*, March 5) of Chelsea College's "validation exercise" made fascinating reading. May we now expect an announcement that the university sector has invented CNAAs?

Yours faithfully,
RAY COWELL
Deputy Rector,
Sunderland Polytechnic.

Letters for publication should arrive by Tuesday morning. They should be as short as possible and written on one side of the paper. The editor reserves the right to cut or amend them if necessary.

Union view

The shape of universities to come

The National Union of Students' latest policy statement on "The Future of the Universities" may be seen by some sections of the academic community as an unnecessarily fierce attack upon a system which desperately needs friends and kind words.

But it is neither accident nor bad taste which led us to produce such a comprehensive critique of the university system at this time. We believe, along with many others, that the restructuring taking place in our universities is likely to shape them at least for the next decade. This makes the paucity of such "alternative plans" as are being proposed on senates and councils all the more worrying.

Alternatives shouldn't simply be about juggling with the figures, to squeeze in an extra few students here, a course option there, especially in the face of a government committed to questioning our rationale.

So it is the basic questions with which NUS is concerned: how the university system managed to become such a soft touch for cuts, and how we can begin to reconstruct our institutions as part of an open and popular system of post-16 education.

Our contention is that the universities are seriously outdated and must be dragged back into the world of technology, unemployment and rapid change. Outdatedness stems from the single philosophical and operational principle of autonomy. It is university autonomy which perpetuates an amazing level of uniformity and conservatism in the style, approach and content of courses; which consistent-

Polys know how to manage money

Sir, - Your correspondent, Mr Michael J. Brown (*THES*, March 19) is rather muddled about polytechnic finances, particularly when he refers to the five LEA polytechnics. These polytechnics are each independent companies limited by guarantee and are responsible for their own financial affairs. All accounts are annually audited by top city auditors in accordance with company law. Each has professional finance officers who are fully involved in the financial management of their institutions. In South Bank Polytechnic, for example, the finance officer is a member of the finance directorate which meets weekly throughout the year. Incidentally, South Bank is not facing any particular dilemma at the moment; in fact, thanks to the current LEA policy of no cuts in education, our block grant of some £18m for 1982/83 was confirmed last week and this represents level funding in real terms compared with 1981/82.

This is not to say, however, that there have not been some difficulties in financial arrangements with the LEA polytechnics. A full account needs more space than is available in this letter but it is true, for example, that problems have been experienced from unexpectedly high rises in costs; gas and telephone charges for example, but above all enormous rises in local rates, which we have to pay. The LEA polytechnics have also felt that the status and salaries of their finance officers have perhaps not fully reflected their responsibilities in what are multi-million pound "businesses".

It is fair to say that the most serious causes of the financial problems which do face us are largely beyond the control of the local authority. For example, the year-by-year basis of funding which makes long term planning almost impossible, the need for very high capital and equipment funding for technological teaching, and the reluctance of governments to support higher education adequately; these are the really serious problems we face, in common of course with the other polytechnics. We are looking to the wider national body to devise more satisfactory funding methods. As a jinx when so many commercial companies are failing, it is simplistic to accuse polytechnics of amateur financial management; the causes of financial problems lie much deeper in the ills of our economy.

Yours faithfully,
JOHN BEISHON
Chairman, Committee of Directors of London Polytechnics.
Director, Polytechnic of the South Bank.

UMIST cuts are necessary

Sir, - Your report "UMIST Cuts Not Needed" (*THES*, March 19) gave an inaccurate account of the conclusions of the report prepared by accountants Arthur Andersen & Company. You must distinguish between the principal findings of the report, and the comments of the AUI.

The report found that UMIST's financial forecasts had been prepared on a "worst possible basis". The UMIST council, which fully understood this, has left £783,000 of the prospective deficit in 1983/4 uncovered in the hope that any one or a combination of factors, including those cited in your article, eg capital works and investment income etc., might contribute, in the light of experience to an improvement in the financial position and an elimination of the deficit. The recent announcement that overseas student fees will reduce next session, in real terms, and impending wage awards above those provided in the estimates, threaten a further deterioration in the cautious financial forecasts which formed the basis for 24 per cent cuts.

The comments of the AUI and their alternative strategies raise false hopes based on a false premise.

Yours faithfully,
D. G. KEEN-LESLIE,
Bursar,
University of Manchester Institute of Science and Technology.



ly puts research above undergraduate teaching; which causes school curricula and GCE examinations to be so outmoded and yet unchanging.

No doubt, some will say this is a jolly good thing, and will not accept that our proposals to reorganize funding, access and control can benefit anyone.

Those critics will be partially correct, for it is quite likely that change will not benefit them. Even those who are sympathetic to our argument may feel squeamish about submitting themselves to local democratic participation, or promoting a university experience for the many sections of society presently excluded. Some of our own student unions have suggested that the theory is fine but are sceptical about putting it into practice. To be sure, it is an ambitious scheme, requiring both political commitment and considerable energy; but why not aim high when we are faced with the dearth of imagination and forward thinking prevalent amongst policymakers of political parties and the Department of Education and Science?

I don't know of an academic who would say that learning for life stops at the age of 19, or even 24. But unless the universities change to meet a variety of needs for learning we believe they will become hopelessly marginal - adopting by default the ethos of elitism and narrow "academic excellence" promoted by this government.

One qualification though: to be honest, we'll also be pressing to influence the politicians. We're not prepared to settle back into a decade of retrenchment and contraction, and to that end we're looking for policy commitments of a radical nature which will ensure that the universities never again have to pay such a high price as a consequence of their history.

Jane Taylor

The author is executive officer of the National Union of Students.

"The Future of the Universities" is available from Martin Stoll, education officer, NUS.